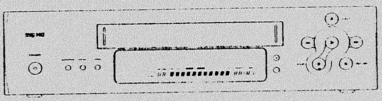
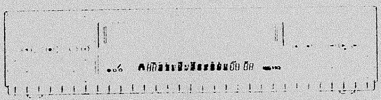
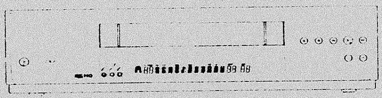
Video Cassette Recorder **Deck: Turbo Drive** **PAOLINA Basic HIFI**

VR665/02/05/16/58
SB65/02/03/16/38
SB75/11/38
DV60/39
DV65/05

Service
Service
Service


VR665/xx


SB65/16/38 - SB75/38


SB65/02/03 - SB75/11 - DVxx/05/39

Service Manual

Contents

Chapter

1 Table of contents per page
  Survey of features
  Survey of PCBs and PCB location
  Technical data
  Safety instructions
  Supplementary service information
  Front/rear view of the video recorder and direction for use

2 Servicing of SMD's
  Dismantling of the set
  Circuit description
  Error diagnosis system

3 Electrical adjustment instructions
  Survey of abbreviations used
  Wiring diagram
  Block diagram
  PCB layout
  Circuit diagrams
  Measurements

4 Tape deck documentation
  Adjustments
  Exploded view of the tape deck
  Parts list tape deck

5 Cabinet exploded view
  Parts lists cabinet and PCB's

Survey of versions:

/02/03	PAL B/G, VPS/PDC
/05	PAL I, UK
/08	PAL B/G, Italy
/11	PAL B/G Belgium
/16	PAL B/G, Spain
/38/39	SECAM L & PAL B/G
/58	PAL/SECAM B/G, D/K

Survey of remote controls:

VR665/xx	RT160/301	4822 218 10717
SB65/02	RT165/201	4822 218 10756
SB65/03		
SB65/16		
SB75/11		
DV65/05		
SB65/38	RT165/204	4822 218 10736
SB75/38		
DV60/39		

Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.

Published by LE9695 Videq Service Department Printed in the Netherlands © Copyright reserved Subject to modification GB 4822 726 15482

PCS 76784 GB

TABLE OF CONTENTS

Page

CHAPTER 1
TECHNICAL DATA AND FEATURES

Front page 1-1
Table of contents 1-2
Survey of sets features and PCB's 1-3
Safety instructions 1-4/5
Description of the system for publication of changes 1-6
Technical specifications 1-7
Front/rear view of the set 1-8
Remote control 1-9

CHAPTER 2
TOOLS FOR ERROR DIAGNOSIS

Servicing of SMDs 2-1/4
Dismantling of the set 2-5/6
Circuit descriptions 2-7/14
IN/OUT Block diagram 2-15/16
Error diagnosis system 2-17/22

CHAPTER 3
PRINTED BOARDS

Adjustment procedures 3-1/4
List of abbreviations 3-5/7
Wiring diagram 3-8
Block diagram analog part 3-9
Block diagram digital part 3-10

Power supply PSM

Circuit diagram PSM 3-11
PCB drawing PSM 3-12

Mother board PMB (MOBO)

PCB drawing Mother board PMB 3-13/14
Head amplifier-**HA** circuit diagram 3-15
Deck electronics-**DE** circuit diagram 3-16
Video/Chroma-**VS** circuit diagram 3-17
Secam-**SE** circuit diagram 3-18
Frontend-**FV** circuit diagram 3-19
IN/OUT-**I/O** - Audio linear-**AL** circuit diagram 3-20
On Screen Display-**OS** Principeschema 3-21

Input/Output - Audio FM board PAF

Circuit diagram PAF - SD 3-22
Circuit diagram PAF - AF 3-23
PCB drawing PAF 3-24

Operating panel PDCP1

PCB drawing PDCP1 3-25
Circuit diagram PDCP1 3-26

Operating panel PDCB1

PCB drawing PDCB1 3-27
Circuit diagram PDCB1 3-28

Operating panel PDCB2

PCB drawing PDCB2 3-29
Circuit diagram PDCB2 3-30

Key board PKP

PCB drawing/Circuit diagram PKP11 3-31

Page

CHAPTER 4
TAPE DECK

Deck parts replacement

Auxiliary tools for deck adjustment 4-1
Deck layout diagrams 4-2
Lift 4-2
Head disc 4-3
A/C Head 4-4
Threading motor 4-4
Capstan motor 4-4
Pressure roller 4-4
Roller unit right 4-4
Roller unit left 4-5

Adjustments

Tape path 4-5
„Roller unit left; roller unit right“ 4-5
A/C Head 4-5
Horizontal distance 4-6
Brake band 4-6
Tape tension adjustment 4-6
Friction clutch control 4-6
Reverse brake control 4-6
Top view, Underside view 4-7

Exploded view

Cleaning and lubrication 4-8/9
Parts list 4-10

CHAPTER 5
PARTS LIST

Exploded view of cabinet parts 5-1
Cabinet parts 5-2
Power supply **PSM1, PSM2, PSM2A** 5-3
Mother board **PMB** PAL - BG - I - SECAM 5-4/9
Audio FM board **PAF** 5-10/11
Operating panel **PDCP1, PDCB1, PDCB2** 5-12

Features

	TV system				Tuning System			Mechanism								
	PAL BG	PAL I IRELAND	PAL BG, SEC L-L`, SEC BG	PAL BG, SECAM BG, DK	Autostrore with Preset	ATS-EURO+	Autoinstall	Videoheads	Audioheads	Video Longplay Pal	Video Longplay Secam	Quick view	Winding Time 95s (E180)	Winding Time 260s (E180)	Tape counter Linear	Tape counter non linear
VR665/02	✓					✓		4	2	✓		✓		✓		✓
VR665/05		✓					✓	4	2	✓		✓		✓		✓
VR665/16	✓				✓			4	2	✓		✓		✓		✓
VR665/58				✓	✓			4	2	✓		✓		✓		✓
SB65/02	✓				✓			4	2	✓		✓		✓		✓
SB65/03	✓				✓			4	2	✓		✓		✓		✓
SB65/16	✓				✓			4	2	✓		✓		✓		✓
SB65/38		✓	✓		✓			4	2	✓	✓	✓		✓		✓
SB75/11	✓				✓			4	2	✓		✓	✓		✓	
SB75/38		✓	✓		✓			4	2	✓	✓	✓	✓		✓	
DV60/39		✓	✓					4	2	✓	✓	✓		✓		✓
DV65/05		✓					✓	4	2	✓		✓		✓		✓

	Video			Audio							Programming				
	Edge Noise Canceller	Studio Picture Control	NTSC Playback	German Stereo	NICAM UK	NICAM NORDIC	NICAM FRANCE	Stereo HIFI / Bilingual	Audio Long play (8h)	Automatic Audio Level Control	Gemstar Showview	Gemstar Video+	VPS	Record prep. mode Scart 1&2	Transm. identif. via VPS/PDC
VR665/02	✓	✓		✓				✓	✓	✓	✓		✓	✓	✓
VR665/05	✓	✓	✓		✓			✓	✓	✓		✓		✓	✓
VR665/16	✓	✓		✓		✓		✓	✓	✓	✓		✓	✓	✓
VR665/58	✓	✓	✓	✓				✓	✓	✓	✓		✓	✓	✓
SB65/02	✓	✓		✓				✓	✓	✓	✓		✓	✓	✓
SB65/03	✓	✓		✓				✓	✓	✓	✓		✓	✓	✓
SB65/16	✓	✓		✓		✓		✓	✓	✓	✓		✓	✓	✓
SB65/38	✓	✓		✓			✓	✓	✓	✓	✓		✓	✓	✓
SB75/11	✓	✓	✓	✓		✓		✓	✓	✓	✓		✓	✓	✓
SB75/38	✓	✓	✓	✓			✓	✓	✓	✓	✓		✓	✓	✓
DV60/39	✓	✓		✓			✓	✓	✓	✓			✓	✓	✓
DV65/05	✓	✓	✓		✓			✓	✓	✓		✓		✓	✓

	Teletext			Connectors		Remote	Special features						
	Synchrotime	Time/Date download	PDC without TXT/VPT	Number of Scartconnectors	Audio out connectors (rear)	Non LCD	OSD/ number of languages	Child lock	Back-up time 7 h	Back-up time 30 min	Back-up time 30 sec	WYSIWYR Analog	Follow TV analog
VR665/02	✓		✓	2	✓	✓	10			✓			✓
VR665/05	✓	✓	✓	2	✓	✓	1			✓			
VR665/16	✓		✓	2	✓	✓	10			✓			✓
VR665/58				2	✓	✓	10			✓			✓
SB65/02	✓		✓	2	✓	✓	10	✓			✓		✓
SB65/03	✓		✓	2	✓	✓	10	✓			✓		✓
SB65/16	✓		✓	2	✓	✓	10	✓			✓		✓
SB65/38	✓		✓	2	✓	✓	10	✓			✓		✓
SB75/11	✓		✓	2	✓	✓	10	✓	✓			✓	✓
SB75/38	✓		✓	2	✓	✓	10	✓	✓			✓	✓
DV60/39	✓		✓	2	✓	✓	10				✓		✓
DV65/05	✓	✓	✓	2	✓	✓	1				✓		

Survey of sets and PCBs

	MOTHERBOARD (MOBO)							OPERATING PANEL PDC					PK		I/O, AF, SD			PS		TAPE DECK			
	-VS signal processing -IO Input / Output -FV Frontend -AL Audio linear -HA Head amplifier -DE Deck electronics -OSD / Follow me					**MOBO Deck-µP pos. 7400**					**PDC - µP pos. 7201**		**KEY BOARD**		**AUDIO FM BOARD**			**POWER SUPPLY**		4 heads PAL	4 heads SECAM	4 heads PAL turbo	4 heads SECAM turbo
	PMB PAL BG	PMB PAL I	PMB PAL-SEC BG, DK	PMB PAL-SEC L - L`		PTDP2-xU		PDCP1	PDCB1	PDCB2	PDCH2-xU	PDCH1-xP	PKP 11		PAF/G	PAF/N	PAF/NGS	PSM1	PSM2A	WDM-P4/2	WDM-S4/2	WDMT-P4/2	WDMT-S4/2
Page 3 -	**13**	**13**	**13**	**13**		**18**		**27**	**29**	**31**	**27**	**27**	**33**		**24**	**24**	**24**	**11**	**11**	**Chapter 4**			
VR665/02	✓					✓		✓			✓		✓		✓			✓		✓			
VR665/05		✓				✓		✓				✓	✓			✓		✓		✓			
VR665/16	✓					✓		✓			✓		✓				✓	✓		✓			
VR665/58			✓			✓		✓			✓		✓		✓			✓		✓			
SB65/02	✓					✓				✓	✓				✓			✓		✓			
SB65/03	✓					✓				✓	✓				✓			✓		✓			
SB65/16	✓					✓			✓		✓						✓	✓		✓			
SB65/38				✓		✓			✓		✓						✓	✓			✓		
SB75/11	✓					✓				✓	✓						✓		✓			✓	
SB75/38				✓		✓			✓		✓						✓		✓				✓
DV60/39				✓		✓				✓	✓						✓	✓			✓		
DV65/05		✓				✓				✓		✓				✓		✓		✓			

GB Safety instructions

- Safety regulations demand that the set be restored to its original condition and that components identical with the original types be used.

  Safety components are marked by the symbol ⚠
- All ICs and many other semi-conductors are susceptible to electrostatic discharges (ESD). Careless handling during repair may reduce life drastically. When repairing, make sure that you are conneted with the same potential as the mass of the set via a wrist strap with resistance. Keep components and tools on the same potential.
- A set to be repaired should always be connected to the mains via a suitable isolating transformer.
- Never replace any modules or any other parts while the set is switched on.
- Use plastic instead of metal alignment tools. This in order to preclude short-circuit or to prevent a specific circuit from being rendered unstable.

Remarks

- The direct voltages and oscillograms ought to be measured relative to the set mass.
  EXCEPTION
  At the power supply, the DC voltages and the oscillograms at the primary side are measured to LIVE GND.
- The direct voltages and oscillograms mentioned in the diagrams ought to be measured with a colour bar signal and the picture carrier at 503.25 MHz (C25).
- The oscillograms and direct voltages have been measured in RECORD or PLAY mode.
- The semiconductors, which are mentioned in the circuit diagram and in the parts lists, are fully exchangeable per position with the semiconductors in the set, irrespective of the type designation of these semiconductors.

D Sicherheitshinweise

- Die Sicherheitsvorschriften erfordern es, daß sich das Gerät nach der Reparatur in seinem originalen Zustand befindet und daß die zur Reparatur benutzten Ersatzteile mit den Originalersatzteilen identisch sind.

  Sicherheits-Bauteile sind mit der Markierung ⚠ versehen
- Alle IC's und Halbleiter sind empfindlich gegen elektrostatische Entladungen (ESD). Unvorschriftmässige Behandlung von Halbleitern im Reparaturfall kann zur Zerstörung dieser Bauteile oder zu einer drastischen Reduzierung der Lebensdauer führen. Sorgen Sie dafür, daß Sie sich im Reparaturfall über ein Armband mit Widerstand auf dem gleichen Potential, wie die Masse des Gerätes befinden. Alle Bauteile, Werkzeuge und Hilfsmittel sind auf das gleiche Potential zu legen.
- Ein zu reparierendes Gerät ist immer über einen Trenntransformator an die Netzspannung anzuschließen.
- Bei eingeschaltetem Gerät dürfen keine Module oder sonstige Einzelteile ausgetauscht werden.
- Zum Abgleich sind ausschließlich Kunststoffwerkzeuge zu benutzen (keine Metallwerkzeuge verwenden). Dadurch wird vermieden, daß ein Kurzschluß entstehen kann oder eine Schaltung instabil wird.

Anmerkungen

- Die Gleichspannung und Oszillogramme sind gegen Gerätemasse zu messen.
  AUSNAHME
  Beim Netzteil sind die Gleichspannungen und Oszillogramme auf der Primärseite gegen Live GND gemessen.
- Die Gleichspannungen und Oszillogramme angeführt in den Schaltbildern sollen unter folgenden Bedingungen gemessen werden: Farbbalkensignal, Bildträger auf 503.25 MHz (C25)
- Die Oszillogramme und Gleichspannungen sind in RECORD oder PLAY gemessen. Die in den Stücklisten aufgeführten Bauteile sind positionsweise voll auswechselbar gegen die Bauteile in dem Gerät, ungeachtet der etwaigen Typenbezeichnungen

F Avertissements

- Les normes de sécurité exigent qu'aprés réparation l'appareil soit remis dans son état d'origine et que soient utilisées les piéces de rechange identiques à celles spécifiées.

  Les composants de sécurité sont marqués ⚠
- Tout les IC et beaucoup d'autres semi-conducteurs sont sensibles aux décharger statiques (ESD). Leur longévité pourrait étre considérablement écourté par le fait qu'aucune précaution n'est prise à leur manipulation. Lors de réparations s'assurer de bien étre relié au méme potential que la masse de l'appareil et enfiler le bracelet serti d'une résistance de sécurité. Veiller à ce que les composants ainsi que les outils que l'on utilise soient également à ce potentiel.
- Toujours alimenter un appareil à réparer à travers un transfo d'isolement.
- Ne jamais remplacer les modules ni d'autres composants quand l'appareil est sous tension.
- Pour l'ajustage, utiliser des outils en plastique au lieu d'instruments métalliques. Ceci afin d'éviter les court-circuits et exclure l'instabilité dans certains circuits.

Observations

- La mésure des tensions continues et des oscillogrammes doit se faire par rapport à la terre de l'appareil.
  EXCEPTION
  Sur l'unité d'alimentation la tension continue et l'oscillogramme sont mesurés sur le côte primaire en Live GND.
- La mésure des tensions continues et des oscillogrammes figurant sur le schéma doit se faire dans un signal de barre couleur porteuse image sur 503.25 MHz (C25).
- Les oscillogrammes et tension sont mésurées en mode RECORD ou PLAY.
- Les semi-conducteurs indiqués dans le schéma de principe et à la liste des compostants, sont interchangeables par repère sur ce chassis avec les semi-conducteurs de l'appareil quelle que soit la désignation de type donnée sur ces semi-conducteurs.

NL Veiligheidsinstructies

- Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkelijke toestand wordt teruggebracht en dat onderdelen, indentiek aan de oorspronkelijke, worden toegepast.
  De veiligheidsonderdelen zijn aangeduid met het symbool

  ⚠
- Alle IC's en vele andere halfgeleiders zijn gevoelig voor elektrostatische ontladingen (ESD). Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen verminderen. Zorg ervoor, dat U tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat. Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.
- Sluit een apparaat dat gerepareerd wordt altijd via een scheidingstransformator aan op de netspanning.
- Verwissel nooit modules of andere onderdelen terwijl het apparaat is ingeschakeld.
- Gebruik voor het afregelen plastic i.p.v metalen gereedschap. Dit om mogelijke kortsluiting te voorkomen of een bepaalde schakeling instabiel te maken.

Opmerkingen

- De gelijksspanningen en oscillogrammen dienen gemeten te worden ten opzichte van de apparaat aarde.
- De gelijksspanningen en oscillogrammen vermeld in de schema's dienen gemeten te worden met een kleurbalkensignaal beelddraaggolf op 503.25 MHz (C25).
- De oscillogrammen en gelijksspanningen zijn in RECORD of PLAY mode gemeten.
- De halfgeleiders, die in het pricipeschema en in de stuklijsten, zijn vermeld, zijn per positie volledig uitwisselbaar met de halfgeleiders in het apparaat, ongeacht de typeaanduiding op deze halfgeleiders.

I Avvertimenti

- Le prescrizioni di sicurezza richiedono che l'apparecchio sia ricondotto alle condizioni originali e che siano usati ricambi originali.

  Componenti di sicurezza sono marcati con ⚠
- Tutti gli IC e semiconduttori sono sensibili a scariche elettrostatiche (ESD). Noncuranze durante la riparazione di semiconduttori possono danneggiarli o condurre ad una riduzione drastica della durata. Durante la riparazione assicurarsi di essere collegati allo stesso potenziale attraverso un bracciale di protezione contro scariche elettrostatiche. Inoltre tenere anche tutti i componenti e gli attrezzi a questo potenziale.
- Apparecchi da riparare bisogna collegarli sempre via un trasformatore isolante (separatore) alla tensione normale.
- Non scambiare moduli o altri componenti quando l'apparecchio è in funzione.
- Per l'accordo usare soltanto attrezzi di plastica (non usare attrezzi metallici). Cosí si evitano cortocircuiti e collegamenti instabili.

Osservazioni

- Misurare le tensioni continue e gli oscillogrammi riferiendosi alla massa dell'apparecchio.
  ECCEZIONE
  Le tensioni continue e gli oscillogrammi dall'alimentatore sono misurati sulla parte primaria contro GND-Live.
- Le tensioni continue e gli oscillogrammi indicati negli schemi di collegamento devono essere misurati secondo le condizioni seguenti: segnale barre colore, portante dell'immagine su: 503.25 MHz (C25).
- Gli oscillogrammi e le tensioni continue sono misurati in RECORD o PLAYBACK.
- I componenti indicati nelle liste sono intercambiabili con quelli nell'apparecchio nonostante l'eventuale denominazione di modelli.

E Avisos

- Las instrucciones de seguridad exigen que después de la reparación el aparato se encuentre en el estado original y que las piezas de repuesto, utilizadas para la reparación, sean idénticas a las originales.

  Los componentes de seguridad estan marcados con ⚠
- Todos los IC y semiconductores son sensibles a descargas electrostáticas (ESD). Un tratamiento no conforme a las instrucciones de semiconductores en caso de reparación, podría llevar a la destrucción de estos componentes, o a una reducción drástica de la duración. Tenga cuidado de que, en caso de reparación, estar al mismo potencial que la masa del aparato, por una pulsera con resistencia. Ponga todos los componentes, herramientas y recursos al mismo potencial.
- Para reparar un aparato hay que conectarlo siempre a la alimentación a traves de un transformador de aislamiento.
- Cuando un aparato está en marcha no pueden ser cambiados módulos u otras piezas de repuesto.
- Para los ajustes hay que utilizar exclusivamente herramientas de plástico (nunca herramientas metálicas). Así se evitaran cortocircuitos y circuitos inestables.

Notas

- Hay que medir las tensiones continuas y los oscilogramas contra la masa del aparato.
  UITZONDERING:
  Bij het netgedeelte zijn de gelijkspanningen en oscillogrammen aan de primaire kant tegen Live GND gemeten.
- Las tensiones continuas y los oscilogramas mencionados en los esquemas tienen que ser medidos de manera siguiente: señal barra de color portadora de imagen en 503.25MHz (C25)
- Los oscilogramas y las tensiones continuas son medidas en „RECORD" y „PLAYBACK"
- Los componentes mencionados en las listas se los puede cambiar por los componentes en el aparato, a pesar de eventuales designaciones de tipos.

GB WARNING FOR LITHIUM BATTERIES!

Lithium batteries, if incorrectly used (excessive heat, wrong connection of terminals, short circuit represent a danger of explosion!
Lithium batteries must be replaced only by original spare parts.

D WARNHINWEIS ZU LITHIUM-BATTERIEN!

Bei fascher Handhabung (Überhitzung, Falschpolung oder Kurzschluß) der Lithium-Batterien besteht Explosionsgefahr!
Lithium-Batterien dürfen nur gegen Originalersatzteile getauscht werden.

F ATTENTION!

Pile au lithium.
Danger d'explosion si traitée incorrectement. Ne peut être remplacée que par un spécialiste (comme décrit dans les instructions de réparation).

NL OPGELET MET LITHIUM-BATTERIJEN!

Bij foutieve behandeling (oververhitting, foutieve poling of kortsluiting) van lithium-batterijen bestaat er explosiegevaar! Lithium-batterijen mogen slechts door originele onderelen vervangen worden.

I ATTENZIONE CON LE PILE AL LITIO!

In caso di utilizzo errato (surriscaldamento, errata posizione dei poli o cortocircuito) delle pile al litio consiste pericolo di esplosione!
Le pile al litio si possone soltituire solo con pezzi di ricambio originali.

E AVISO!

Bateria de litio.
Por una inadecuada intervención puede explotar.
Solo debe ser cambiada por una persona con conocimientos técnicos (como en la guía de reparación se describe).

DK ADVARSEL!

Lithium batteri. Eksplosionsfare.
Udskiftning ma kun foretages af en sagkyndig, og som beskrevet in servicemanualen.

S VARNING!

Eksplosionsfara vid felaktigt batteribyte!
Använd samma batterityp eller ekvivalent typ som rekommenderas av apparattillverkaren.

SF VAROITUS!

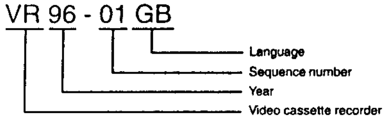
Paristo voi räjähtää, jos se on virheellisesti asennettu!
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin.

Modifications

Description of the system used for publishing modification data and supplements to the service manual.

All modification data and supplements to the Service Manual are published by means of Service Information bulletins.

Each Service information has a number, for example :


VR 96 - 01 GB
Language
Sequence number
Year
Video cassette recorder

A Service Information bulletin concists of a front sheet, as the case may be followed by supplementary and/or replacement sheets.

Replacement sheets serve to replace existing sheets in the Service Manual. These sheets are identified by an additional letter after the page number, for example 5-1a. Page 5-1a then takes the place of page 5-1.

Supplementary sheets are inserted between the existing sheets in the Service Manual. These sheets can be identified by an additional figure following the page number, for example 5-1-1.

Sheet 5-1-1 should be inserted after page 5-1.

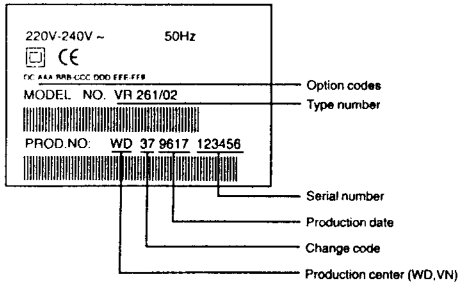
Description of the system by means of which modifications are indicated in the recorder.

All important parts of the recorder, such as tape deck, p.c. boards and modules, are provided with a sticker. These stickers specify a number of product data. The meaning of this data will now be explained for the most important sections.

The complete recorder

The type plate is located at the back of the recorder, below an example of such a type plate is given.

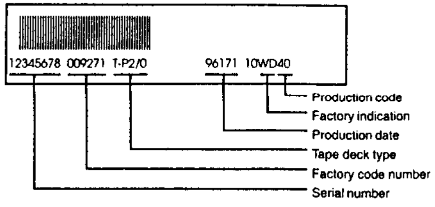
Type plate :


220V-240V ~
50Hz
CE
MODEL NO. VR 261/02
PROD.NO: WD 37 9617 123456
Option codes
Type number
Serial number
Production date
Change code
Production center (WD,VN)

Note :

In the case of an important modification to the recorder the productionscode on the type plate is increased by one. E.g. 37 becomes 38.

Tape deck


12345678 009271 T-P2/0
96171 10WD40
Production code
Factory indication
Production date
Tape deck type
Factory code number
Serial number

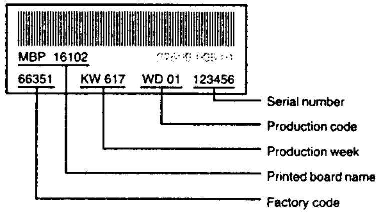
Note :

The production code and the serial number on the tape deck need not correspond to the production code and the serial number on the type plate.

Printed panels

The stickers are generally located on the track side of the module.

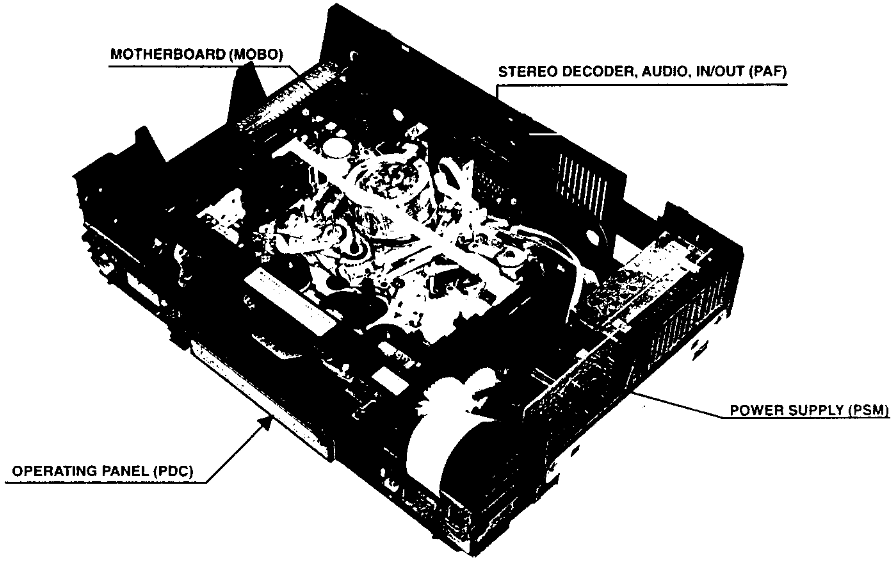
Example :


MBP 16102
66351 KW 617 WD 01 123456
Serial number
Production code
Production week
Printed board name
Factory code

Remarks :

The production code number will not always be mentioned.

In case of an important modification, the last figure of the factory code number (point number) is increased by one. E.g. 6635.1 becomes 6635.2.


MOTHERBOARD (MOBO)
STEREO DECODER, AUDIO, IN/OUT (PAF)
POWER SUPPLY (PSM)
OPERATING PANEL (PDC)

GB TECHNICAL DATA	D TECHNISCHE DATEN	F CARACTERISTIQUES	
Mains voltage	Netzspannung	Tension secteur	220 - 240 V
Mains frequency	Netzfrequenz	Fréquence	45 - 65 Hz
Power consumption:	Leistungsaufnahme:	Puissance absorbée:	typ.15 W during operation
without Low Power Standby	Standby	sans la fonction veille faible consommation	typ.10 W during standby
with Low Power Standby	Standby mit geringem Verbrauch	avec la fonction veille faible consommation	< 6 W standby
Ambient temperature	Raumtemperatur	Température ambiante	+10°C to +35°C
Relative humidity	Relative Luftfeuchtigkeit	Humidité relative	20 - 80 %
Dimensions	Abmessungen	Encombrement	380 x 320 x 94 mm
Weight	Gewicht	Poids	3,7 kg
Fast forward/rewind time (turbo)	Vor-/Rückspulzeit (turbo)	Temps (re-)bobinage (turbo)	typ. 95s (E180 cass.)
Position of use	Betriebslage	Position d'emploi	horizontally, max. 15°
Video resolution	Video-Auflösung	Puissance absorbée	≥240 lines
Audio	Audio	Audio SP: Linear Audio	80Hz - 10kHz (≤8dB)
		Audio LP: Linear Audio	80Hz - 5kHz (≤8dB)
		Stereo FM Audio	20Hz - 20kHz (≤3dB)

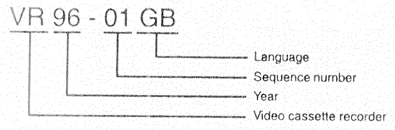
NL TECHNISCHE GEGEVENS	E DATOS TECNICOS	I DATI TECNICI	
Netspanning	Tensión de red	Tensione di alimentazione	220 - 240 V
Netfrequentie	Frecuencia de red	Frequenza di rete	45 - 65 Hz
Opgenomen vermogen:	Consumo de potencia:	Potenza assorbita:	typ.15 W during operation
zonder Low Power Standby	sin standby de bajo consumo	in attesa non a basso consumo	typ.10 W during standby
met Low Power Standby	con standby de bajo consumo	in attesa a basso consumo	< 6 W standby
Omgevingstemperatuur	Temperatura ambiente	Temperatura ambiente	+10°C to +35°C
Relatieve vochtigheid	Humedad relativa	Umiditá relativa	20 - 80 %
Afmetingen	Dimensiones	Dimensioni	380 x 320 x 94 mm
Gewicht	Peso	Peso	3,7 kg
Vooruit/terugspoeltijd (turbo)	tiempo de (re-)bobinado (turbo)	Tempo di (ri-)avvolgimento (turbo)	typ. 95s (E180 cass.)
Gebruikspositie	Posición de uso	Posizione di funzionamento	horizontally, max. 15°
Opplossend vermogen	Resolución video	Risoluzione video	≥240 lines
Audio	Audio	Audio SP: Linear Audio	80Hz - 10kHz (≤8dB)
		Audio LP: Linear Audio	80Hz - 5kHz (≤8dB)
		Stereo FM Audio	20Hz - 20kHz (≤3dB)

Modifications

Description of the system used for publishing modification data and supplements to the service manual.

All modification data and supplements to the Service Manual are published by means of Service Information bulletins.

Each Service information has a number, for example :


VR 96 - 01 GB
Language
Sequence number
Year
Video cassette recorder

A Service Information bulletin concists of a front sheet, as the case may be followed by supplementary and/or replacement sheets.

Replacement sheets serve to replace existing sheets in the Service Manual. These sheets are identified by an additional letter after the page number, for example 5-1a. Page 5-1a then takes the place of page 5-1.

Supplementary sheets are inserted between the existing sheets in the Service Manual. These sheets can be identified by an additional figure following the page number, for example 5-1-1.

Sheet 5-1-1 should be inserted after page 5-1.

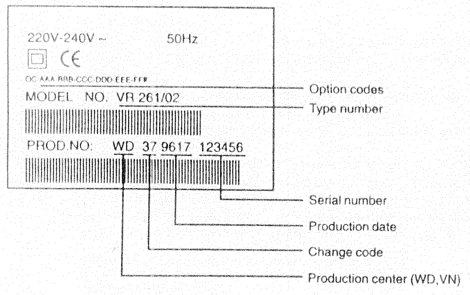
Description of the system by means of which modifications are indicated in the recorder.

All important parts of the recorder, such as tape deck, p.c. boards and modules, are provided with a sticker. These stickers specify a number of product data. The meaning of this data will now be explained for the most important sections.

The complete recorder

The type plate is located at the back of the recorder, below an example of such a type plate is given.

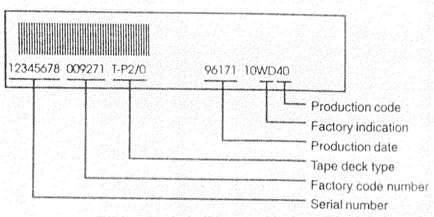
Type plate :


220V-240V ~
50Hz
OC AAA BBB-CCC-DDD-EEE-FFF
MODEL NO. VR 261/02
PROD.NO: WD 37 9617 123456
Option codes
Type number
Serial number
Production date
Change code
Production center (WD,VN)

Note :

In the case of an important modification to the recorder the productionscode on the type plate is increased by one. E.g. 37 becomes 38.

Tape deck


12345678 009271 T-P2/0
96171 10WD40
Production code
Factory indication
Production date
Tape deck type
Factory code number
Serial number

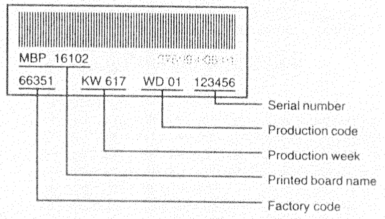
Note :

The production code and the serial number on the tape deck need not correspond to the production code and the serial number on the type plate.

Printed panels

The stickers are generally located on the track side of the module.

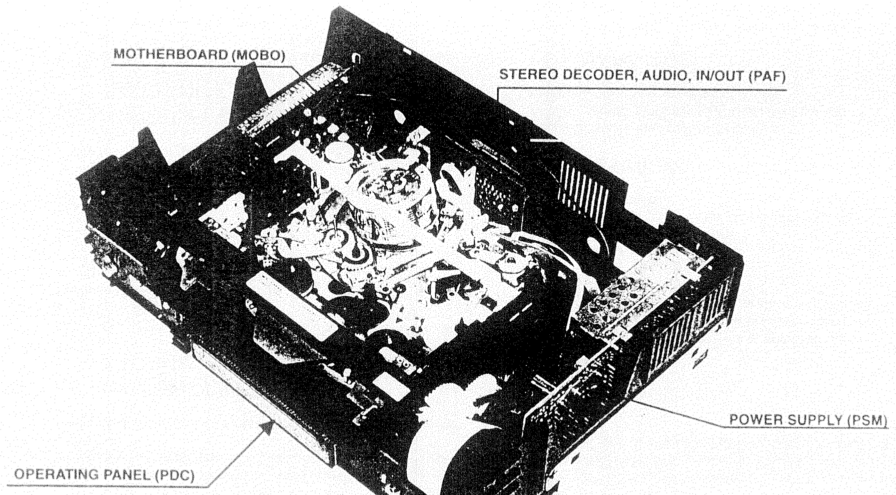
Example :


MBP 16102
66351
KW 617
WD 01
123456
Serial number
Production code
Production week
Printed board name
Factory code

Remarks :

The production code number will not always be mentioned.

In case of an important modification, the last figure of the factory code number (point number) is increased by one. E.g. 6635.1 becomes 6635.2.

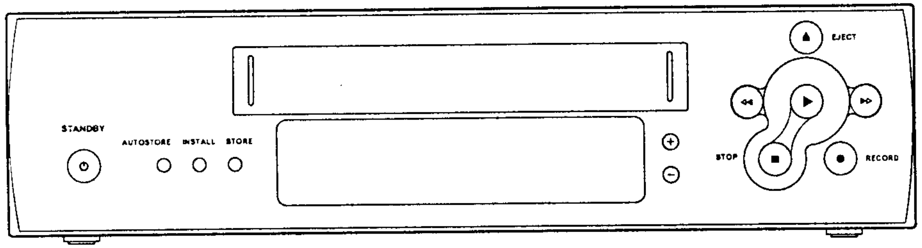

MOTHERBOARD (MOBO)
STEREO DECODER, AUDIO, IN/OUT (PAF)
POWER SUPPLY (PSM)
OPERATING PANEL (PDC)

GB TECHNICAL DATA	D TECHNISCHE DATEN	F CARACTERISTIQUES	
Mains voltage	Netzspannung	Tension secteur	220 - 240 V
Mains frequency	Netzfrequenz	Fréquence	45 - 65 Hz
Power consumption:	Leistungsaufnahme:	Puissance absorbée:	typ.15 W during operation
without Low Power Standby	Standby	sans la fonction veille faible consommation	typ.10 W during standby
with Low Power Standby	Standby mit geringem Verbrauch	avec la fonction veille faible consommation	< 6 W standby
Ambient temperature	Raumtemperatur	Température ambiante	+10°C to +35°C
Relative humidity	Relative Luftfeuchtigkeit	Humidité relative	20 - 80 %
Dimensions	Abmessungen	Encombrement	380 x 320 x 94 mm
Weight	Gewicht	Poids	3,7 kg
Fast forward/rewind time (turbo)	Vor-/Rückspulzeit (turbo)	Temps (re-)bobinage (turbo)	typ. 95s (E180 cass.)
Position of use	Betriebslage	Position d'emploi	horizontally, max. 15°
Video resolution	Video-Auflösung	Puissance absorbée	≥240 lines
Audio	Audio	Audio SP: Linear Audio	80Hz - 10kHz (≤8dB)
		Audio LP: Linear Audio	80Hz - 5kHz (≤8dB)
		Stereo FM Audio	20Hz - 20kHz (≤3dB)

NL TECHNISCHE GEGEVENS	E DATOS TECNICOS	I DATI TECNICI	
Netspanning	Tensión de red	Tensione di alimentazione	220 - 240 V
Netfrequentie	Frecuencia de red	Frequenza di rete	45 - 65 Hz
Opgenomen vermogen:	Consumo de potencia:	Potenza assorbita:	typ.15 W during operation
zonder Low Power Standby	sin standby de bajo consumo	in attesa non a basso consumo	typ.10 W during standby
met Low Power Standby	con standby de bajo consumo	in attesa a basso consumo	< 6 W standby
Omgevingstemperatuur	Temperatura ambiente	Temperatura ambiente	+10°C to +35°C
Relatieve vochtigheid	Humedad relativa	Umiditá relativa	20 - 80 %
Afmetingen	Dimensiones	Dimensioni	380 x 320 x 94 mm
Gewicht	Peso	Peso	3,7 kg
Vooruit/terugspoeltijd (turbo)	tiempo de (re-)bobinado (turbo)	Tempo di (ri-)avvolgimento (turbo)	typ. 95s (E180 cass.)
Gebruikspositie	Posición de uso	Posizione di funzionamento	horizontally, max. 15°
Opplossend vermogen	Resolución video	Risoluzione video	≥240 lines
Audio	Audio	Audio SP: Linear Audio	80Hz - 10kHz (≤8dB)
		Audio LP: Linear Audio	80Hz - 5kHz (≤8dB)
		Stereo FM Audio	20Hz - 20kHz (≤3dB)

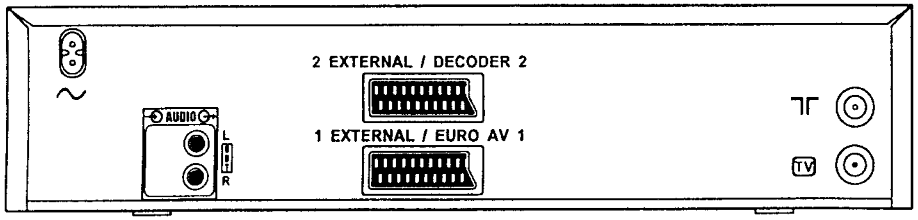
Front of the set

STANDBY ⏻	Standby switch
● RECORD	Record
+	Up/Plus, programme number
−	Down/Minus, programme number
AUTOSTORE	Channel search
INSTALL	Supplementary installation button
STORE	Store TV channel
▲ EJECT	Cassette eject
STOP ■	Pause/Stop
◁◀	Rewind/Reverse scanning
▶	Playback
▶▷	Forward wind/ Forward scanning

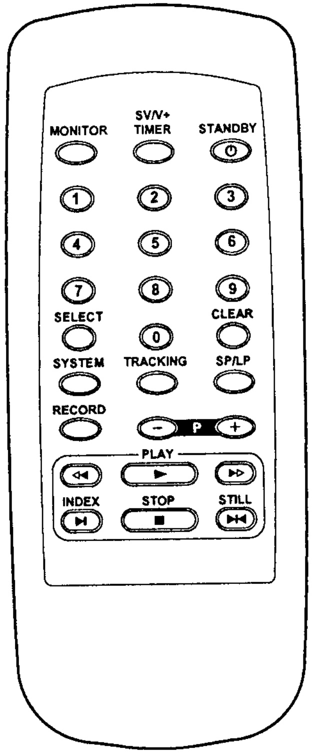

EJECT
STANDBY
AUTOSTORE
INSTALL
STORE
STOP
RECORD

Back of the set

∿	Mains socket
AUDIO OUT L	Audio out channel left
AUDIO OUT R	Audio out channel right
2 EXTERNAL/DECODER 2	Scart (AV-Euro) socket
1 EXTERNAL/EURO AV 1	Scart (AV-Euro) socket
┐┌	Aerial input socket
TV	Aerial output socket


∿
AUDIO
L
R
2 EXTERNAL / DECODER 2
1 EXTERNAL / EURO AV 1
┐┌
TV

The remote control


MONITOR
SV/V+ TIMER
STANDBY
1
2
3
4
5
6
7
8
9
SELECT
CLEAR
0
SYSTEM
TRACKING
SP/LP
RECORD
−
P
+
PLAY
INDEX
STOP
STILL

MONITOR	TV monitor function
SV/V+ TIMER	'VIDEOplus' or 'TIMER' programming
STANDBY ⏻	Standby switch
0-9	Digit buttons 0-9
SELECT	Function selector
CLEAR	Reset, clear
TRACKING	Tracking
SP/LP	Tape speed selection (SP/LP)
RECORD	Record
P−	Down/Minus, programme number
P+	Up/Plus, programme number
◁◀	Rewind/Reverse scanning
PLAY ▶	Playback
▶▷	Forward wind/ Forward scanning
INDEX ▶▌	Index search
STOP ■	Pause/Stop
STILL ▶◀	Still picture

Buttons that are not described in the list have **no** function.

TOOLS FOR ERROR DIAGNOSIS

Replacement procedure for leadless components (chip)

The following procedures are recommended for replacing leadless components used in this unit.

1. Preparation for replacement

a. **Soldering iron**
Use a pencil-type soldering iron that uses less than 30W.

b. **Solder**
Use Eutectic solder
(Tin 63%, Lead 37%)

c. **Soldering time**
Maximum 4 seconds.

Note:
a. Leadless components must not be re-used after removal.

b. Excessive mechanical stress and rubbing of the component electrode must be avoided.

2. Removing the leadless components

Grasp the leadless component body with tweezers and alternately apply heat to both electrodes. When the solder on both electrodes has melted, remove leadless component with a twisting motion.

Note:
a. Do not attempt to lift the component off the board until the component is completely disconnected from the board with a twisting motion.

b. Be careful not to break the copper foil on the printed circuit board.

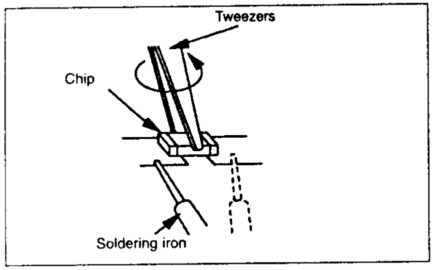

Tweezers
Chip
Soldering iron

Fig. 2-1

3. Installation of leadless components

a. Presolder the contact points on the circuit board.

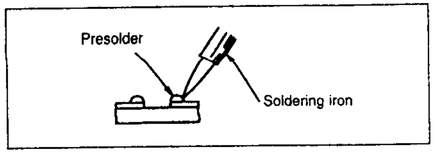

Presolder
Soldering iron

Fig. 2-2

b. Using tweezers press down the part and solder both electrodes as shown below.

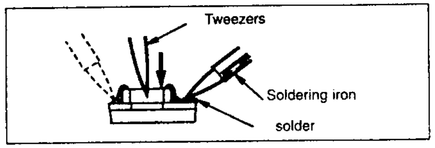

Tweezers
Soldering iron
solder

Fig. 2-3

Note:
Do not glue the replacement component to the circuit board.

How to remove/install the FLAT PACK IC

1. How to remove the Flat Pack IC

• Using a hot air Flat Pack IC unsoldering equipment

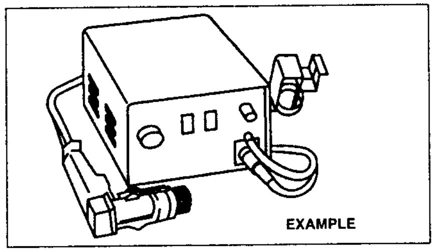


Fig. 2-4

a. Prepare the hot air Flat Pack IC unsoldering equipment. Then apply hot air to Flat Pack IC for 5 - 8 seconds.

b. Remove the Flat Pack IC with tweezers while applying the hot air.

CAUTION:
To avoid damage, do not apply the hot air to the chip parts around the Flat Pack IC for long periods.

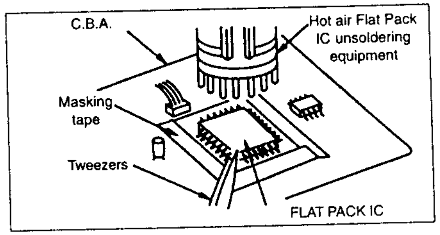

C.B.A.
Hot air Flat Pack IC unsoldering equipment
Masking tape
Tweezers
FLAT PACK IC

Fig. 2-5

Put masking tape around the Flat Pack IC to protect adjacent parts.

2. The Flat Pack IC is fixed to the P.C.B. with glue; therefore take care not to break or damage any foil under the IC or on each pin when removing it.

• Using a soldering iron

a. Use unsoldering braid to remove the solder from all pins of the Flat Pack IC.
Apply solder flux to all pins of the Flat Pack IC, to allow easy removal.

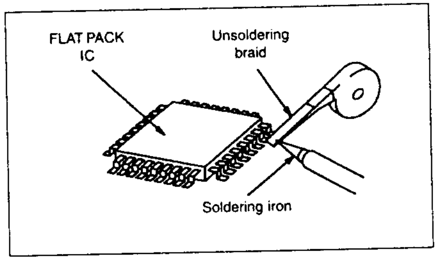

FLAT PACK IC
Unsoldering braid
Soldering iron

Fig. 2-6

b. Lift up each lead of the Flat Pack IC individually, using a sharp pin or non-solder wire (iron wire), while heating the pins using a fine tip soldering iron or a hot air blower.

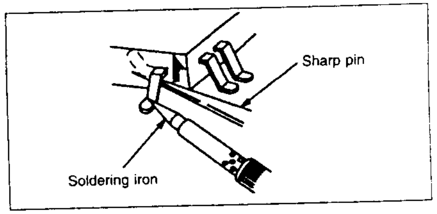

Sharp pin
Soldering iron

Fig. 2-7

• Using iron wire

a. Use unsoldering braid to remove the solder from all pins of the Flat Pack IC. Apply solder flux to all pins of the Flat Pack IC, to allow easy removal.

b. Affix the wire to workbench or solid mounting point (see Fig. 2-8)

c. Pull up the wire as the solder melts in order to lift the IC lead from the P.C.B. contact pad, while heating the pins using a fine-tip soldering iron or hot air blower.

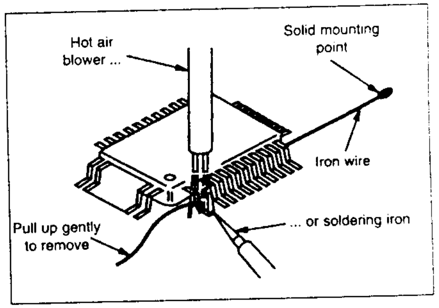

Hot air blower ...
Solid mounting point
Iron wire
Pull up gently to remove
... or soldering iron

Fig. 2-8

Note:
When using a soldering iron care must be taken to ensure that the Flat Pack IC is not held by glue or the P.C.B. may be damaged if force is used.
If the IC is glued, heat the IC with hot air to loosen the glue.

2. How to install the FLAT PACK IC

a. Use unsoldering braid to remove the solder from the foil of each pin of the Flat Pack IC on the P.C.B. in order to install the replacement Flat Pack IC more easily.

b. The "•" mark on the Flat Pack IC indicates pin 1.
Make sure this mark matches the 1 on the P.C.B. when positioning for installation. Then pre-solder the four corners of the Flat Pack IC. (see Fig. 2-9).

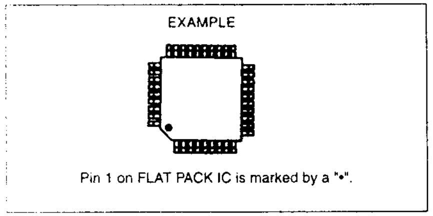

EXAMPLE
Pin 1 on FLAT PACK IC is marked by a "•".

Fig. 2-9

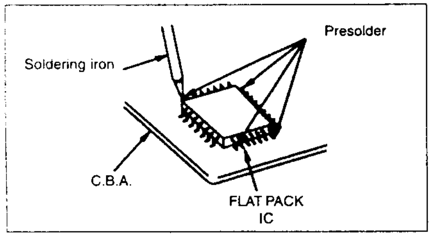

Presolder
Soldering iron
C.B.A.
FLAT PACK IC

Fig. 2-10

c. Solder all pins of the Flat Pack IC. Make sure that none of the pins have solder bridges between pins on the Flat Pack IC.

Note

All integrated circuits and many other semiconductor devices are electrostatically sensitive and therefore require the special handling techniques described in the "SAFETY INSTRUCTIONS" section of this manual.

Voltage measurements

Color bar signal in SP REC and PB modes.

Note:
Voltage indications for the REC. and PB mode on the schematic diagrams are shown below:

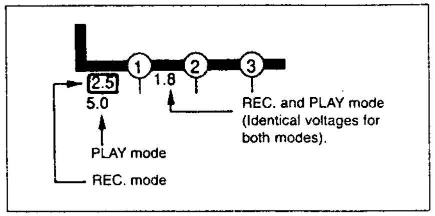

1
2
3
2.5
1.8
5.0
PLAY mode
REC. mode
REC. and PLAY mode (Identical voltages for both modes).

Fig. 2-11

How to read wave forms

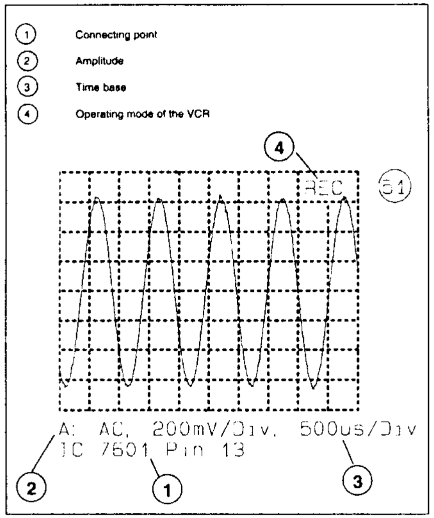


Fig. 2-12

Voltage Indication of Zener diodes

The Zener voltage of Zener diodes is indicated as such on schematic diagrams:

Example:
BZX79C20............Zener voltage: 20 Volts

How to identify connectors on schematic diagrams

Each connector is labeled with a connector number and a pin number indicating to what component it is connected; in other words, its counterpart.

Use the Connecting Wiring Diagram to find the connections between associated connectors.

Example:
The connections between C.B.A.s are shown below:

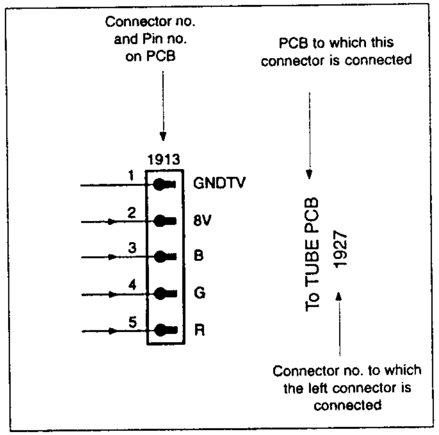

Connector no. and Pin no. on PCB
PCB to which this connector is connected
1913
1
2
3
4
5
GNDTV
8V
B
G
R
To TUBE PCB
1927
Connector no. to which the left connector is connected

Fig. 2-13

Test point information

With this model, test pin or components leads are used as contact points for adjustment and checking. In case of other test points with no test pin or components leads, use the foil solder pad to connect the measuring equipment.

Removal or installation of flat cables

a. Removal
Pull out the flat cable, holding it securely to avoid damaging individual wires (see fig. 2-14).

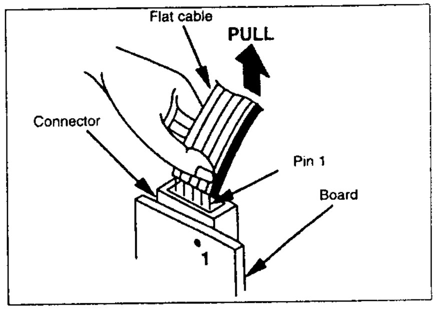

Flat cable
PULL
Connector
Pin 1
Board
1

Fig. 2-14

b. Installation

1. Adjust the position of the flat cable so that the lines on the flat cable align with the pins X of the trap connector (see fig. 2-14).
2. Align individual wires with its individual trap connector hole. Then insert the flat cable wire into the trap connector.

   CAUTION: After Installation, Inspect the connection to insure that individual wires are not bent or touching other wires.

Dismantling Instructions

General guidelines for dismantling the housing components, the electronics and the drive.

Always disconnect from mains before dismantling or assembly.

Due to supply voltages (hot circuit) on the input side of the switched-mode power supply, an isolating transformer must be used to operate the unit.

The drive or the drive - motherboard combination may not be lifted by holding the cross struts of the lift!

To detect power supply faults, we recommend the use of a variable transformer.

After assembling the unit, check for the earthing screw (M) on the underside of the housing.

1. Housing cover (Fig. 1)

- Remove screws A,B,C and D with Torx screwdriver 10 *
- Push centre of housing cover sides on underside approx. 1 cm outwards and lift the housing cover back over the three latch positions.
- Move cover up at least 4 cm.
- Remove housing cover.

Assemble in reverse order.

2. Base plate (Fig. 2)

Preparation:
Remove housing cover as described in section 1.

- Turn over unit (underside facing upwards).
- The base plate can be lifted after unlocking the nine snap holders (S1-S9) from left to right.

3. Front panel (Fig. 3)

Preparation:
Remove housing cover as described in section 1.

- Push both snap holders (P1) outwards and tilt panel top forward up to stop (approx. 3mm).
- Then undo both snap holders on the top (P2).
- Finally, undo the three snap holders (P3) on the underside and remove front panel by pulling it forward.

Installation:
- Insert front panel parallel to the operating print until snap holders engage.
- Connect lift flap lever to guide of lift flap.

Important!
- Check whether all snap holders have engaged !

4. Operating print - PDC (Fig. 4)

Preparation:
Remove housing cover as described in section 1.
Remove front panel as described in section 3.

- By undoing the four snap holders D3,D4 (side) and D1,D2 (top) below the drive position, the operating print can be folded out of its position.
- When changing the operating print, first undo the motherboard cable connection.

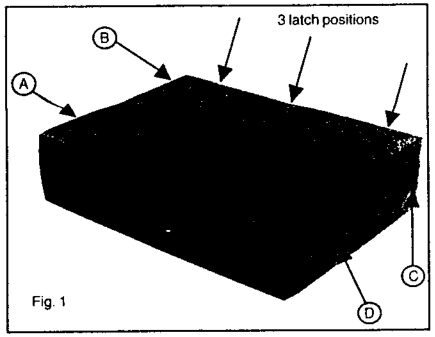


Fig. 1

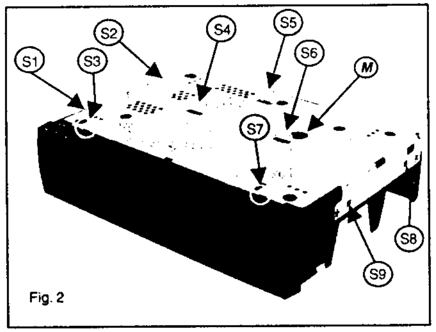


Fig. 2

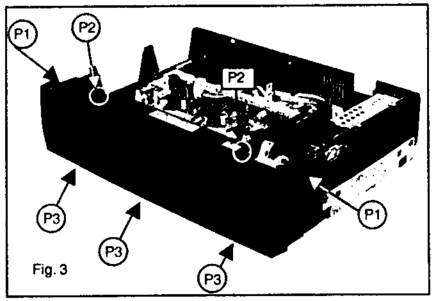


Fig. 3

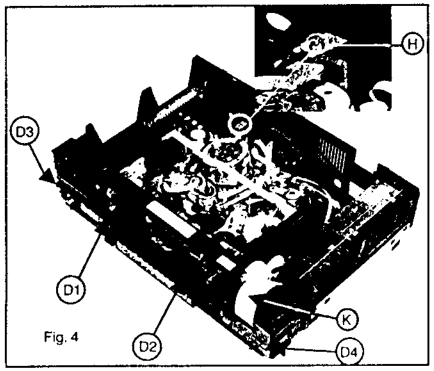


Fig. 4

* ...available from dealers

---

5. Dismantling the motherboard-drive combination

Preparation:
Remove housing cover as described in section 1.
Remove front panel as described in section 3.

- Remove the three holding screws (F) from the motherboard (Fig. 5), most of the models do not have this screws.
- Push lift back by 5 cm, after unlocking both lift stops.
- Undo the three drive screws (G), (Fig. 5).
- Carefully undo cable (K) of the motherboard operating print plate (Fig. 4).
- Undo the snap holders of the power supply (1) (Fig. 5) and lift power supply slightly.
- Turn the unit round (Fig.2).
- Remove the earthing screw (M), (Fig. 2).
- Release snap holder (2) by pushing the snap holder downwards and lift up the frame.
- Undo release the snap holders (3) by pushing the snap holder downwards and lift the frame (Fig. 5).
- Now the frame can be carefully lifted off.
- Turn the motherboard-drive combination and place in the service position (Fig. 6) if necessary. The unit can be operated in this position.
- Reconnect the cable between the operating print and the motherboard.

Important!
For carrying out electrical adjustments, or to evaluate the picture quality, the earthing screw (M) (Fig. 2) must be replaced (earthing for the head amplifier).

Installation:
- Position on an even surface with the frame opened to the top.
- Hold the drive on the side at the lift and insert the motherboard drive into the frame.
- Check that the power supply and Scart socket positions are in openings.
- Check that all motherboard snap holders are engaged !
- Turn the unit round and replace the earthing screw (M) !
- Replace screws (F), if applicable (Fig. 5).
- Replace the drive screws (G) (Fig.5).
- Reconnect the cables.

6. Dismantling the drive

Preparation:
Remove housing cover as described in section 1.
Remove front panel as described in section 3.

- Position unit with underside facing upwards. Undo earthing screw of drive M (Fig. 2).
- Return unit to initial position.
- Push lift back by 5 cm after unlocking both lift stops.
- Undo the three drive screws G (Fig. 5).
- Position lift up to the stop in the "Eject" position.
- Undo screw H with Torx screwdriver 8*. (Fig.4)
- Carefully undo all cable connections to the motherboard.
- Slightly lift the left rear side of the drive to undo the plug-in connection.
- Loosen both snap holders with pliers (L) and lift up the drive around the snap holders (Fig. 5).
- The drive can now be released from the motherboard (Fig. 7).

Important!
Push back the "head line cover" at screw level (H) approx. 1cm. (Fig.4).

Assemble in reverse order.

Important!
Push back the "head line cover" at screw level (H) approx. 1cm. (Fig.4) and position drive parallel to motherboard on left guide pin of frame.
Check that all snap holders have engaged.

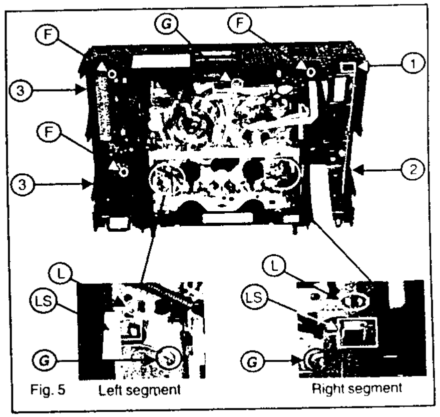


Fig. 5

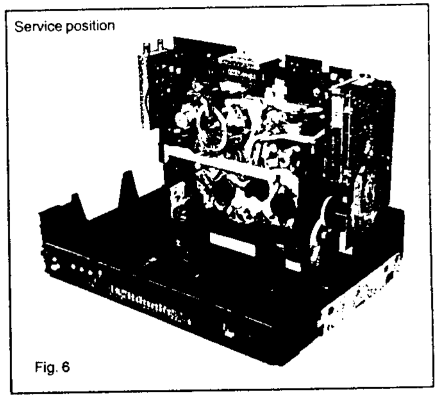


Fig. 6

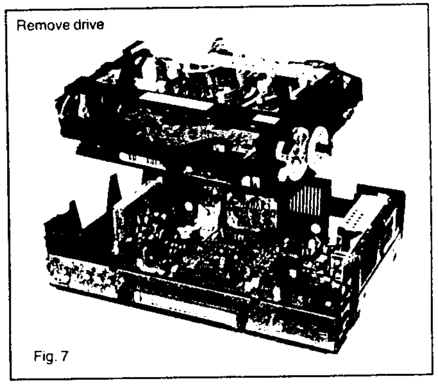


Fig. 7

* ...available from dealers

Dismantling Instructions

General guidelines for dismantling the housing components, the electronics and the drive.

Always disconnect from mains before dismantling or assembly.

Due to supply voltages (hot circuit) on the input side of the switched-mode power supply, an isolating transformer must be used to operate the unit.

The drive or the drive - motherboard combination may not be lifted by holding the cross struts of the lift!

To detect power supply faults, we recommend the use of a variable transformer.

After assembling the unit, check for the earthing screw (M) on the underside of the housing.

1. Housing cover (Fig. 1)

- Remove screws A,B,C and D with Torx screwdriver 10 *
- Push centre of housing cover sides on underside approx. 1 cm outwards and lift the housing cover back over the three latch positions.
- Move cover up at least 4 cm.
- Remove housing cover.

Assemble in reverse order.

2. Base plate (Fig. 2)

Preparation:
Remove housing cover as described in section 1.

- Turn over unit (underside facing upwards).
- The base plate can be lifted after unlocking the nine snap holders (S1-S9) from left to right.

3. Front panel (Fig. 3)

Preparation:
Remove housing cover as described in section 1.

- Push both snap holders (P1) outwards and tilt panel top forward up to stop (approx. 3mm).
- Then undo both snap holders on the top (P2).
- Finally, undo the three snap holders (P3) on the underside and remove front panel by pulling it forward.

Installation:
- Insert front panel parallel to the operating print until snap holders engage.
- Connect lift flap lever to guide of lift flap.

Important!
- Check whether all snap holders have engaged !

4. Operating print - PDC (Fig. 4)

Preparation:
Remove housing cover as described in section 1.
Remove front panel as described in section 3.

- By undoing the four snap holders D3,D4 (side) and D1,D2 (top) below the drive position, the operating print can be folded out of its position.
- When changing the operating print, first undo the motherboard cable connection.

---

* ...available from dealers

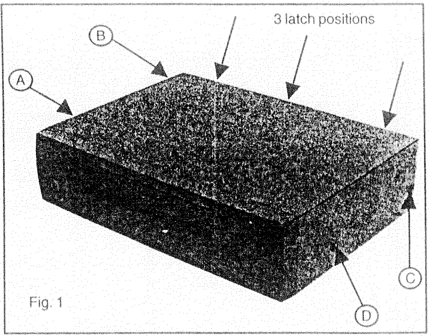


Fig. 1

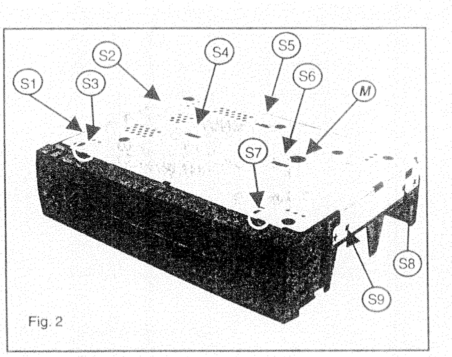


Fig. 2

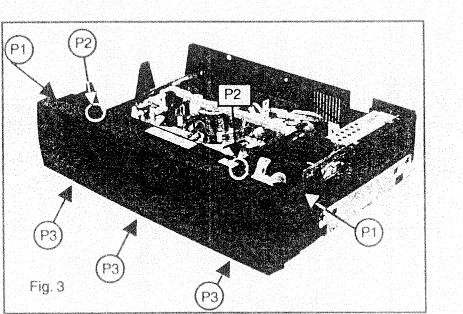


Fig. 3

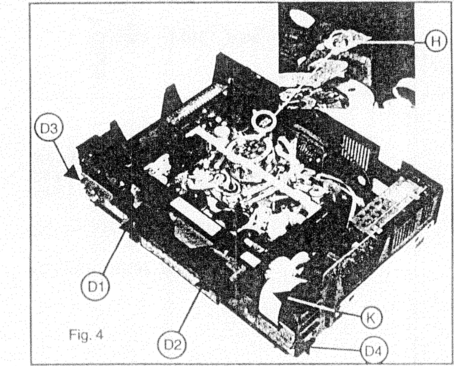


Fig. 4

5. Dismantling the motherboard-drive combination

Preparation:
Remove housing cover as described in section 1.
Remove front panel as described in section 3.

- Remove the three holding screws (F) from the motherboard (Fig. 5), most of the models do not have this screws.
- Push lift back by 5 cm, after unlocking both lift stops.
- Undo the three drive screws (G), (Fig. 5).
- Carefully undo cable (K) of the motherboard operating print plate (Fig. 4).
- Undo the snap holders of the power supply (1) (Fig. 5) and lift power supply slightly.
- Turn the unit round (Fig.2).
- Remove the earthing screw (M), (Fig. 2).
- Release snap holder (2) by pushing the snap holder downwards and lift up the frame.
- Undo release the snap holders (3) by pushing the snap holder downwards and lift the frame (Fig. 5).
- Now the frame can be carefully lifted off.
- Turn the motherboard-drive combination and place in the service position (Fig. 6) if necessary. The unit can be operated in this position.
- Reconnect the cable between the operating print and the motherboard.

Important!
For carrying out electrical adjustments, or to evaluate the picture quality, the earthing screw (M) (Fig. 2) must be replaced (earthing for the head amplifier).

Installation:
- Position on an even surface with the frame opened to the top.
- Hold the drive on the side at the lift and insert the motherboard drive into the frame.
- Check that the power supply and Scart socket positions are in openings.
- Check that all motherboard snap holders are engaged !
- Turn the unit round and replace the earthing screw (M) !
- Replace screws (F), if applicable (Fig. 5).
- Replace the drive screws (G) (Fig.5).
- Reconnect the cables.

6. Dismantling the drive

Preparation:
Remove housing cover as described in section 1.
Remove front panel as described in section 3.

- Position unit with underside facing upwards.
  Undo earthing screw of drive M (Fig. 2).
- Return unit to initial position.
- Push lift back by 5 cm after unlocking both lift stops.
- Undo the three drive screws G (Fig. 5).
- Position lift up to the stop in the "Eject" position.
- Undo screw H with Torx screwdriver 8*. (Fig.4)
- Carefully undo all cable connections to the motherboard.
- Slightly lift the left rear side of the drive to undo the plug-in connection.
- Loosen both snap holders with pliers (L) and lift up the drive around the snap holders (Fig. 5).
- The drive can now be released from the motherboard (Fig. 7).

Important!
Push back the "head line cover" at screw level (H) approx. 1cm. (Fig.4).

Assemble in reverse order.

Important!
Push back the "head line cover" at screw level (H) approx. 1cm. (Fig.4) and position drive parallel to motherboard on left guide pin of frame.
Check that all snap holders have engaged.

---

* ...available from dealers

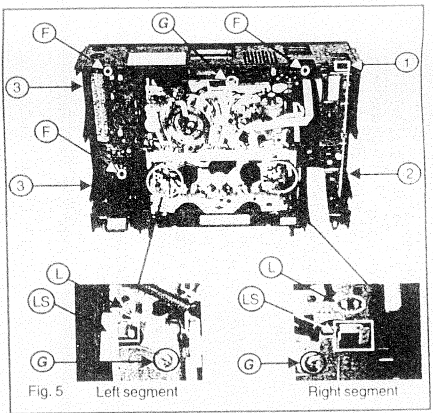


Fig. 5

Service position

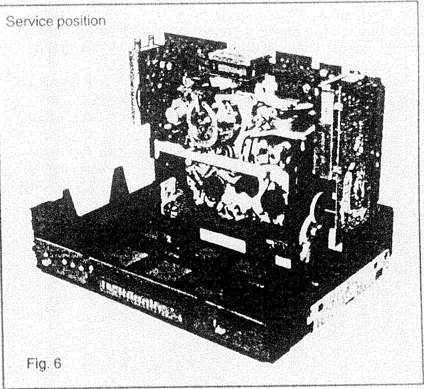


Fig. 6

Remove drive

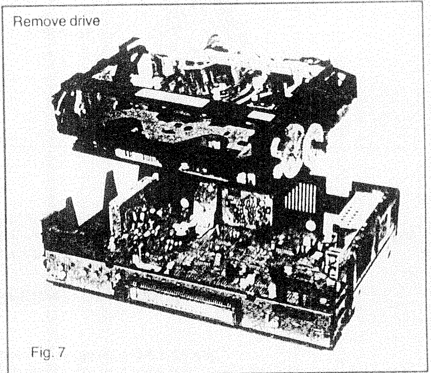


Fig. 7

Circuit Description

PDC Operating Circuit

The microcomputer [7201] is the heart of the operating circuit. Its respective functions and tasks are indicated below:

- Shuttle evaluation.
- Jog evaluation.
- Keyboard matrix evaluation.
- Decoding of remote control commands from the Infrared Receiver Pos7203.
- Quartz clock.
- OSD (for BASIC)
- Integrated RAM for storing timer data.
- Display control.
- Bi-directional serial interface for data exchange between the operating section and the sequence control computer.
- I2C bus interface (SDA - pin 77, SCL - pin 23) to TUMOD [1701], VPS/PDC decoder [7540] and the EE-PROM [7890] on the motherboard.

Any drift caused by the tuner or the aerial input signal will generate a AFC control voltage. This voltage is required by the receiving circuit (FV) on the motherboard. The AFC voltage is generated at pin 78, via this pin the operating computer will adjust the tuning voltage as required

In the event of a power failure, the backup cell (connected to pin 33) will supply the clock and the RAM for 30 minutes [2997, 47mF gold capacitor], or for 7 hours [2997, 220 mF gold capacitor], depending on the model Diode [6299] prevents the backup cell from discharging totally. When the voltage across the cell drops, pin 2 will be at low level, thus preventing the IC from functioning. The low level at pin 2 preventing the Quartz System clock from running [1298] is connected to pins 13 / 14).

Switch-mode power supply PSM 1/2/3

Specification:

Mains voltage:	187-264 Vrms
Maximum output:	50 W
Operating frequency:	100 kHz
Efficiency:	78 % at maximum output

Functional principle (Flyback converter):

During the conductive phase of the switching transistor, energy is transferred from the mains to the transformer. This energy is passed to load during the blocking phase. The energy transferred in each cycle is regulated by the switch-on time in such a way that the output voltages are not affected by load or input voltage changes. The integrated circuit [7020] takes over the control of the power transistor.

Low power standby mode: (PSM 2 /3)

The switch-mode power supply operates in burst mode. The power input is less than 1 watt In Standby mode only the 5VSTBY will remain present

Standby mode: (PSM 1/2a)

The switch-mode power supply operates at a controlled low frequency of approx. 50 kHz, to minimise switching losses.

Reversal Point

At this point of the output characteristic, maximum output is transferred.

Overload:

The power supply operates in burst mode. The energy of every cycle is limited so that the output performance is low (Fig. 1).

Circuit description:

The power supply system is protected by coil [5010] from faults originating in the power supply. The supply voltage is rectified by the bridge rectifier [6050] and filtered by the electrolytic capacitor [2070]. Electrolytic capacitor [2036] will be charged via [3050, 3052] and supplies the IC [7020] during the start-up phase, after which transformer winding 4-3 and diode [6036] maintain the supply. During the time that the switching transistor is switched on, current flows from the rectified supply voltage through the primary winding of the transformer, the transistor [7040] and resistors [3048, 3046] to ground. As the positive voltage at pin 9 of the transformer is constant (in this example), the current will rise linearly, forming a ramp irrespective of the supply voltage and inductivity of the primary winding. A magnetic field representing a certain energy quantity will be generated within the transformer. At this period in time the secondary voltages are polarised in such a way that the diodes on the secondary of the transformer will be blocked. A voltage image of the primary current is passed to the IC [7020] at pin 7 via resistors [3048, 3046,3026]. This is checked and, upon reaching a stipulated value depending on the control voltage at pin 14, transistor [7040] will be switched off.

After the switching transistor has been switched off, no further energy is transferred into the transformer. The inductivity of the transformer now attempts to maintain the current which has passed through it at a constant level (U=L*di/dt). The current falls, however, and di/dt will as a result become negative. At the same point in time the polarity of the voltages generated on the secondary of the transformer reverse. This will cause a current to pass through the secondary windings of the transformer, the diodes (now forward biased), electrolytic capacitors and the load. This current is also ramp shaped (but decreasing). The power supply is controlled by changing the conductive phase of the switching transistor, so that either more or less energy is transferred from the supply to the transformer. The control information arrives from reference element [7074], which compares the 5 V with an internal 2.5V reference voltage. The output voltage from the reference element [7074] passes via an optocoupler (for isolation) to a pin on the IC [7020], where the voltage is compared to the internal reference. The resulting value changes the level with which the voltage at pin 7 (primary current image!) is compared. The voltage at pin 5 of the IC is used for fold back in the case of an overload.
The maximum secondary output which can be drawn is determined by resistors [3046,3048].
From a certain voltage (typically 1 V) at pin 7 of the IC, the power supply reaches its point of reversal.
The circuitry at pin 11 of the IC is optional. By using [2014], the start-up phase is started with shorter pulses so that the switching frequency lies beyond the audible range.

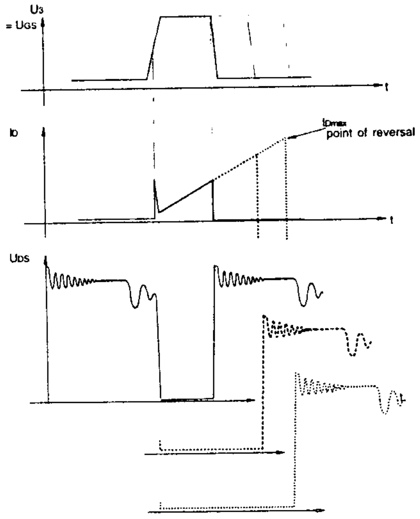


Fig. 1

On the secondary side, seven voltages are available. All are rectified by [6076, Y6082, 6081, Y6092, 6080, Y6088, 6098, Y6096]. An alternating voltage, generated by transistors [7058, 7060], is used for heating the display. The capstan motor voltage 8/17M is switched by transistor [Y7090].

PSM2/3:

The transistor [7050] and the resistor [3071] affect the control of the switched-mode power supply. An excessive 5V voltage is "faked" for the IC [7020] via the optocoupler [7020], leading the IC to enter the BURST MODE (see also *Nominal operation, overload, standby* paragraph!). A high-level STBY (pin 18 of connector strip [1509]) switches the power supply to the LOW POWER STAND-BY MODE.

The IC [7085] stabilises the 5VSTBY voltage which may have a maximum loading of 1mA!

Description of the start-up phase

After connection to the mains supply, the following voltages at the connectors of the IC [7020] (see Fig. 2) increase at time to.. Vcc(pin 1), according to the half-cycle charge via resistors [3050, 3052] to Vccstart. The power consumption is in this situation typically 0.3 mA. The internal reference voltage Vref of the IC is switched on when reaching the Vccstart (approx. 13 V). The oscillator starts to run. The frequency is determined by the capacitor at pin 10 (approx. 100 kHz), which is charged/discharged by power sources. The power consumption then rises to 17 mA.

The voltage at pin 11 rises linearly (soft start). The IC starts with shortened pulses until pin 11 has reached a voltage of 2.4V.

If Vcc falls below the limit value Vdis2 before reaching the point of reversal, or if Vcc (control loop fault) rises to Vccprot (typically 16 V), the start-up is stopped (pin 3 is switched off) and the IC (Uref) is switched off. Vcc rises according to a half-cycle load and a new start-up cycle begins.

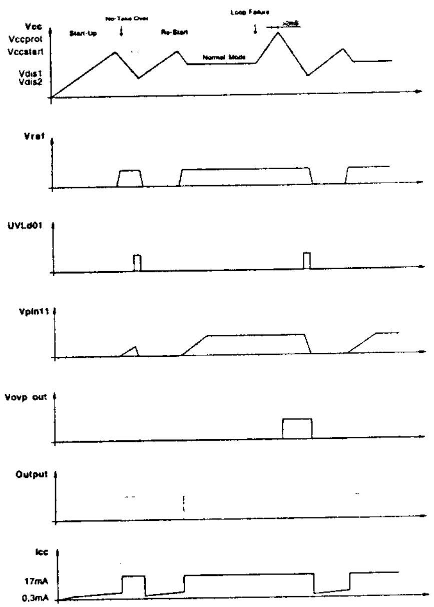


Fig. 2

Nominal operation, overload, standby

After the start-up, the IC runs [7020] inside its control range. The voltage at connector 14 typically is 2.5 V. If the load rises on the secondary side of the Transformer, the switch-on time is increased. The peak voltage value at pin 7 (drain current image) is also increased.

If the load increases further, the overload amplifier (typically 1 V at pin 7) of the IC reduces the pulse width of U3 (reversal point).

The IC supply Vcc behaves like the secondary voltages. Consequently, Vcc also decreases with increasing load. In case of the condition Vcc < Vdis1 (approx. 9 V), the IC changes to the burst mode (query operation).

The short-circuit power is low, due to the large last interval between the half-cycle start-ups.
A decreasing load reduces the switch-on time. If the load drops any further, the IC switches the frequency back to approx. 50 kHz (Standby Mode) from a certain voltage threshold at pin 7 (depending on the circuitry at pins 12, 15). This keeps the switching losses in the transistor low.

Excess temperature

The IC [7020] contains excess temperature protection, blocking the logic in case of excessive chip temperature (typically 155 °C). After the temperature has decreased, a new start-up cycle will be made.

Front-end - FV

The front-end was developed for the following transmission standards:

- PAL B/G with FM stereo
- PAL I or PAL BG with NICAM stereo
- PAL BG with NICAM and FM stereo
- PAL BG/I SECAM L/L' with NICAM and FM stereo
- PAL BG SECAM DK with FM stereo

The respective model is identified in the version list of the circuit diagram.

All front-end models conform to EN 55020.

The FM stereo decoder (TDA9840) and the NICAM decoder (SAA 7284) are located on the PAF subprint.

1. Tuner modulator (TUMOD)

Tuner and modulator are located in the same housing.
Both the tuner and the modulator are PLL controlled. The reception frequency or modulator frequency is set with the IIC bus.
The amplification is determined by the AGC voltage at pin 5 (see AGC function below).

2. IF selection

The IF frequency of the picture carrier is 38.9 MHz for all systems with the exception of SECAM L' (33.9 MHz).
For PAL BG-SECAM DK and for PAL BG/I-SECAM L/L' a quasi split sound system is used; i.e. separate Surface Wave Filters (OFW) are required (1719, 1721).
For all other standards, an intercarrier system is used; i.e. a mutual OFW with sound carrier attenuation can be used for picture and sound carriers (1720 at TDA 9800 or 1721 at TDA 9813).
The sound SWF (L9454M and K9460M) used contain two different switchable filter characteristics.
For the PAL BG/I-SECAM L/L' type, an additional circuit is installed to suppress the flanking channel sound carrier which is set to maximum suppression at 40.4 MHz via spool 5721.

3. IF demodulator

a) TDA 9800
The output signal of the SWF is initially amplified and then synchronously demodulated. The carrier required for this is generated with a PLL from the input signal. The integral VCO oscillates at double the picture carrier frequency (77.8 MHz) and this frequency is divided internally. The loop filter for the PLL is connected to pin 6. The offset current of the phase comparator is compensated with a potentiometer 3743 (balance to min. audio s/n) to achieve an optimum demodulation. Pin 15 has an AFC (Automatic Frequency Control) voltage which is evaluated for station tuning.
At pin 13, a demodulated video and sound carriers at 6.0 MHz or 5.5 MHz (FM sound) or at 6.552 MHz or 5.85 MHz (NICAM sound, see below) is available. The video signal is passed to an internal 6dB buffer (pin 14) after passing through a 6.0 MHz and 5.5 MHz sound trap. Behind the output of the buffer (pin 7), a voltage divider and an emitter follower for level adaptation (1Vpp) are located. A subsequent 6.5 MHz trap suppresses the NICAM signal in the video (for PAL I only).

The FM sound carrier is passed from pin 13 via a 6.0 MHz or 5.5 MHz sound filter to the internal FM PLL demodulator with output pin 9. An external transistor amplifier serves as FM deemphasis and level adaptation (500mVeff at 27 kHz deviation, 1 kHz audio).

b) TDA 9813T
The TDA9813T may be operated in the QSS or Intercarrier (PAL BG only, pin 28 to ground). Internally separated subassemblies are available for the IF signal processing for picture and sound.
Video input stage, see TDA9800T. This IC does not require any setting of the phase offset. The loop filter is connected to pin 5. The AFC is available at pin 20. The video branch is analog as for the TDA9800T; the second sound trap is not required.
The IC contains an output for the sound carriers on 5.5 MHz and 5.74 MHz. These are connected to the FM demodulators via filters (pin 14, 15). The audio signals are passed to the stereo decoder TDA9840T for stereo decoding (see below).
For NICAM, a second IF is passed via jumper 4717 to the PAF (can contain NICAM).

c) TDA 9814T
This IC is only operated in the QSS. In comparison to the TDA 9813, it contains an AM demodulator for SEC L, L'. The second sound IF is passed via an HEF IC 7722 either to the sound filters for FM stereo 5.5/5.74 MHz or to a 6 MHz filter for PAL I reception.

d) AGC
The two-stage AGC is the same for all ICs. During small signals, the control is carried out only in the IF-IC, with the tuner operating with its maximum amplification. Starting at a certain input level (take-over point), the IF-IC sends out a control signal for the tuner. From this input voltage onwards, the control is practically carried out only by the tuner. The take-over point is set with the AGC-Adj. potentiometer (3742) to maximum sensitivity and input interference immunity.
The IF-AGC voltage is applied to the deck microprocessor via transistor 7724 which then sends the information on the signal level to the operating microprocessor on the front panel.
This is used to determine the sequence of programs to be stored in the autostore mode.

Video Signal Processing - VS

Switch-over functions of the signal electronics IC LA7437:

REC/PB:
The switch-over between REC and Playback-modes is controlled by the 5 VPB voltage via diode 6000 which is connected to pin 6:

PB	> 3.8 V
REC	< 3.8 V

NTSC/SECAM BG/PAL
The switch-over between colour systems (NTSC playback only) is activated by the voltages at pin 30 (INTSC):

NTSC	>3.3 V
(ME-)SECAM B/G	=1.8... 2.7 V
PAL	<1.2 V

SP/LP/SLP
The change-over of speed modes (NTSC: SP/LP/SLP, PAL/ SECAM: SP/LP) is activated by the signal at pin 25 (LP):

SLP	>3.3 V
LP	=1.8... 2.7 V
SP	<1.2 V

VIDEO ENTRY
The artificial picture pulse for playback features and the internal test pattern (Installation Screen) enters at pin 19 (FFP):

Loop through	< 0.8 V
Test picture	= 1.2 ... 3.3 V
Artificial picture pulse	> 3.7 V

COLOUR VECTOR
The colour vector is influenced by pin 27 (HSC2):

normal	< 1.2 V
LP features colour (⎍)	= 2 ... 2.7 V
NTSC playback colour	> 3.9 V

FEATURE
In feature modes, pin 33 (TRICK) > 3.9 V is pulled up.

Recording :

1. Luminance

Pin 12 is the Video input pin. In IC7051 the video signal first passes through amplification control (time constant determined by C 2085). After this form of AGC, the signal path divides into a branch which is looped through via the clamping, output amplifier and emitter follower by the signal electronics and to further signal processing in the signal electronics IC. The latter path runs via a 6 dB attenuator, is also clamped onto a d.c. level and passed via a 3.5 MHz lowpass filter for the chroma separation and for vertical emphasis, which contains an 1H-CCD delay line in IC 7060 (in pin 20, out via pin 18). The signal then passes through an internal amplifier / impedance transformer and an external emitter follower (pin 4). The filter found at the base of the emitter follower does not operate in the REC mode, due to the low resistance of the emitter follower. The Y signal then passes through the detail enhancer, the linear and non-linear preemphasis (time constants) determined by the switching of pin 6, 7, 8 and the white/dark clipping stage.
The thus generated signal then directly controls the FM modulator. The Y-FM signal leaves IC 7051 via pin 2, and is passed through an emitter follower and a lowpass filter before it is finally passed on to the head amplifier [7150] as the FMRV signal.

2. Chrominance PAL

The chroma signal is separated from the incoming video signal (pin 12) by a lowpass filter and passes via 2 switches to an ACC stage. The ACC amplifier stage controls the chroma amplitude for the subsequent stages (time constant by a capacitor and pin 41). The chroma signal is then passed to the main converter. The main converter mixes the 5.06 MHz subcarrier of the auxiliary converter with the 4.43 MHz chroma signal to the 627 kHz output signal (at pin 38).

The subcarrier is a mixture of 4.43 MHz (the REC-APC time constant at pin 33 compares the quartz and burst frequency) and (40+ 1/8) fH = 627 kHz (generated by 321fH -VCO, time constant pin 36/37 and phase rotation according to the VHS standard, control pin 17). By using a band-pass filter and the colour killer stage, the converted chroma signal is passed to pin 38 of the IC, from where it is added directly to the Y-FM signal via an adjustment controller. The colour killer can either identify the incoming signal automatically (PAL/yes/no) or by the control line CKPAL at pin 39 (forced mode: PAL < 2.5 V, SECAM L > 2.5 V). In addition to the reference frequency and chroma processing, the quartz oscillation (pin 32) also serves for the clock frequency generation of the combi CCD [7060, pin 12].

3. SECAM B/G

The signal path is nearly identical to that of PAL.
The exceptions are:

- No phase rotation.
- The filter characteristics of the chroma band-passes are wider.
- Free running quartz oscillator frequency
- The deck microprocessor [7410] generates the control signal for SECAM B/G.

4. SECAM L

The FBAS signal (VREC) for the I/O circuit passes via emitter follower [7101] to the cloche filter, which cancels the transmitter-introduced RF preemphasis. In Secam L, pin 29 of[7110] the signal passes through a 15 dB amplifier and via pin 24 and pin 25 to a limiter with a subsequent frequency divider.
The latter generates the 1.1 MHz signal for recording through frequency division (1:4) of the chroma signal, which is then activated at pin 21 with the subsequent band-pass filter. The band-pass filter attenuates the harmonics generated from the frequency division. At the same time, the chroma signal is output at this stage during the period of the synchronous line pulse. Consequently, it then passes through a 10 dB amplifier and is switched to pin 15 at an anti-cloche filter. Consequently, the FM preemphasis, which is provided as standard for a SECAM chroma signal, is generated again.
This is then passed to the signal electronics path as a CSR signal, where it is added to the luminance FM signal (FMRV).

Control of recording / playback :

The switchover between record and playback is generated by the 5 VPB voltage [7105]. If the 5 VPB voltage is missing, the CB diode of the transistor Pos7105 (Collector 0V) is conductive and pulls the voltage of pin 23 to 1.3 V, switching the IC from playback to record. The 5 VPB voltage pulls pin 23 to 3.2 V.

Playback :

1. Luminance

The FM playback signal from the (FMPV) is passed from the head amplifier [7150] to the signal electronics. During FM processing, the signal is amplified, filtered and passed via pin 1 to the signal electronics IC [7051]. At this stage, the level of the envelope is controlled (FM-AGC, pin 10), limited via a double limiter, and the signal is FM demodulated and filtered with a lowpass. The demodulated Y signal still contains the recording-sided preemphasis. This, in turn, removes the linear deemphasis at the base of the emitter follower [7007]. Additionally, the frequencies are raised by approx. 2 MHz (peaking). The filter circuit is effective as pin 4 becomes an open-collector output in the playback mode, whose last impedance is determined by the deemphasis/peaking circuit. The Y signal is then clamped, filtered by a lowpass and is passed via the vertical noise canceller or dropout compensator. For this, the Y signal leaves the IC7051 and is delayed in the IC7060 by 1 H (out pin 20, in pin 18). The CCD 1H delay line operates for the Y signal as a comb filter (vertical noise suppression), and as a line storage for the dropout compensation. The subsequent circuit stages are: the non-linear deemphasis, horizontal noise canceller and the picture control circuit for sharpness. The chroma signal is then added to the luminance signal and is output as a FBAS signal (pin16,VSB).

2. Chroma PAL

The FMPV signal is connected via pin 38 to the signal electronics IC, from which the subsequent lowpass filter filters the 627 kHz. The ACC amplifier amplifies and controls the chroma amplitude. In the main converter, the chroma signal is mixed with 5.06 MHz to the original 4.43 MHz. The 5.06 MHz is generated from the free running quartz oscillator and the (40+1/8) fH = 627 kHz frequency derived from the 321fH -VCO. After the main converter, the chroma signal is almost completely free of crosstalk from adjacent tracks by the 2 H comb filter (CCD IC, Pos7060). The chroma signal is then filtered via a band-pass filter, checked by the colour killer, looped through pin 28 and 29, and finally added to the Y signal.

3. Chroma SECAM B/G

The signal path is nearly identical to that of PAL.
With the following exceptions:

- The 321 fH VCO is synchronised by the sync.
- No phase rotation.
- The comb filter is not active.
- Internal band-pass filters have a wider band width.
- No colour killer function, the colour is always switched on.
- The deck microprocessor [7410] generates the control signal for SECAM B/G (MES, pin 30).

4. Chroma SECAM L

In playback mode the FM signal on the tape (FMPV) is connected to pin 23, amplified by 6 dB and then passed through the same band-pass as that used during recording, and is once again amplified by 10 dB. After pin 16, the RF preemphasis introduced in the recording process is cancelled. The anti-cloche circuit used in the record mode operates as a cloche circuit in this case.
In the subsequent stages, the signal is adjusted (AGC) and its frequency doubled. The band-pass at pin 10 removes any unwanted harmonics from the signal, before doubling its frequency once again. To turn the signal into a standard Secam Chrominance signal, it is provided with RF preemphasis (anti-cloche). The chroma signal then passes through a colour killer stage, a band-pass filter and an emitter follower before it passes as a CSP signal via a coupling capacitor to pin 29 of the signal electronics IC on the motherboard [7051].

5. NTSC

During playback of NTSC signals, the original NTSC chroma signal is converted to a PAL chroma signal (control signals, see above). Along with the internal switch-over caused by this Colour system within the chroma IC, a switch-over is also required by the CCD IC 7060 to a 1 H comb filter for crosstalk reduction. Line and picture frequencies remaining unchanged, but, however, according to the NTSC standard.

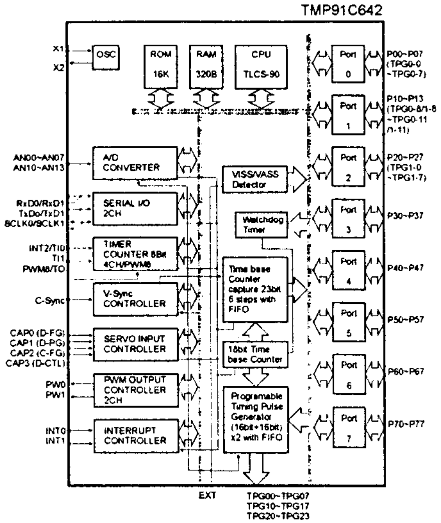
Deck electronics - DE

1. General :

The TVC (Toshiba Video Controller) is a single chip microcontroller, offering the following functions:

- 12k byte ROM
- 320 byte ROM
- 8-bit A/D converter
- 2 serial bus interfaces
- 2x12-bit PWM outputs (pulse wide modulation)
- 1x 8-bit PWM output
- Composite sync input
- Special Servo inputs

The TVC contains two serial interfaces for data exchange with other µPs. The component is supplied in a QFP (64 pin) or SDIP housing (64 pin).
8+4 analogue inputs are available. The resolution of the converter is 8 bit. The maximum possible input voltage range is 0...5 V (determined by the reference voltages AVSS and AVCC). Three analogue outputs are provided, two with 12 bit and one with 8 bit resolution. These outputs supply a signal with a constant frequency (PWM8 approx. 20 kHz, PWM1, PWM2 approx. 39 kHz) with variable pulse/pause proportions.



a) CTL Stage :

The SAA 1310 IC contains a write/read stage for the CTL track, with the option of overwriting an existing CTL track without interference. The playback stage contains "digital " two-stage AGC. This switching logic detects the size of the output signals supplied by the CTL head via comparators and then selects the most effective amplification factor in the playback stage.
The CTL head voltage can consequently vary considerably if V_{max} / V_{min} >> applies. The LP mode has the slowest tape speed. The fastest speed is reached during FAST WIND or FAST SEARCH. To guarantee that the pulse/pause ratio of the band sync is always reproduced correctly under the above conditions (important for the detection of VISS markings), the amplifier cannot be over driven.
The two-stage AGC cannot process the large dynamic range of the input voltage on its own. Consequently, the amplifier also contains a lowpass characteristic (fg = 3 kHz typically) (internal). The amplification is also further reduced by the transistor 7469 for all WIND modes.
In this case, signal IWIND = "L" and T7469 are blocked. The transistor is intentionally polarised inversely, as inverse operation produces an improved attenuation characteristic for this application. If T7469 is blocked, amplification is determined mainly by the internal negative feedback resistors in the SAA 1310, and the external resistor 3488. Through optional short-circuiting of R3488 with T7469, the amplification can be reduced in the following ratio:

V on/V off = 1 + R3488 / 100.

The RC element containing C2464 and R3489 is located parallel to the CTL head. The capacitor and the CTL head inductivity cause excessive resonance at approx. 10 kHz. R3489 attenuates this excessive resonance.
It causes an aperiodic oscillation caused by this resonance. Beyond the resonance frequency, a steep drop occurs in the frequency transmission. This effectively suppresses high frequency interference. The CTL head signal amplitude in SP is (typically) approx. 1 mVp. Consequently, the amplification of the playback amplifier must be correspondingly high. To avoid offset problems, a 47 µF electrolytic converter (C2463) is installed in the negative feedback branch for DC decoupling.

The playback amplifier can switch over its polarity with the Capstan-Reverse (CREV) voltage. Irrespective of the band transport direction, this is the only way in which the TVC always "identifies" the correct sync slope as the falling slope. The write/read (W/R) signal is used for switching between recording and playback:

W = "H", R = "L".

b) POR (Power On Reset) generator :

The POR generator in the SAA 1310 requires only one external capacitor C2467, determining the length of the POR pulse.
For a value of 33 nF, t_{POR} is approx. 30 msec. The response threshold of the reset circuit lies between 4.5 and 4.8 V. Supply voltage dips which are shorter than t_{POR}/100 and do not fall below a level of 3.5 V and hence do not produce a POR.

c) The sensor Interface :

The four comparators in the SAA 1310 are used for converting the sensor signals to logic levels. Two of these comparators contain open-collector outputs (pin 11 and 13), which can switch a current of 100 mA. The outputs are overload-protected by current limiters and thermal overload protectors. Only the non-inverted input of each comparator is externally accessible. The other inputs are positioned at the internal reference of nom. 2.5 V. The fixed hystereses of the comparators of approx. 10 mV is also positioned internally.

Switching the comparator:
Comparator 1 : In = FTA, pin 5; Out = FTAD, pin 15:
FTA = Threading tachometer. This signal stems from a light barrier in the deck. An infrared light barrier is interrupted by a 4-blade butterfly wheel. The output amplitude of the light barrier must fluctuate at least between the voltage levels 2 V and 3 V to guarantee safe evaluation. An additional hystereses is realised with R3492.

Comparator 2 : In = WTR, pin 6; Out = WTRD, pin 14 :
WTR = Winding tachometer right, stems from a reflex light barrier. For this level, the same as for FTA applies.

Comparator 3 : In = WTL, pin 7; Out = WTLD, pin 13 :
WTL = Winding tachometer left, see above (not for ECO).

Comparator 4 : In = FG, pin 8; Out = FGD, pin 11 :
FG = Capstan tachometer. This signal is provided by the Sensorprint of a Tachometer Hall Sensor amplifier on the motor unit and is then amplified. The output impedance is approx. 10 kOhm. The amplitude of the near sinus-shaped signal is normally 1 Vp. and may not fall below 300 mVpp. The signal is AC coupled by C2468. To allow a bias current to flow, the input pin 8 must be connected to the reference voltage pin 3 via the resistor 3491. C2465 for filtering high-frequency interference is provided parallel to the bias resistor.

3. Interface to head-wheel motor driver :

The head-wheel motor driver IC TDA5241 contains a fully integrated 'Start-up' circuit.
The connection of the HMO driver TDA5241 [7300] to the head-wheel motor on the motherboard print is made by connector Pos1930.

• REEL	is the speed-phase control signal. The resolution is 14 bit.
• PG/FG	is the combined POS/tachometer signal from the TDA5241.

The current input from the +14M1 is 70 mA at ambient temperature (normal). During motor start-up, approx. 0.5 A may flow for a short period.

4. Interface to the Capstan motor :

The driver IC on the Capstan motor is controlled via connector 1946.
CAP is the signal for the Capstan speed. It is a voltage which can vary between 0 and 5 V without load.
The rotational direction of the motor is influenced with CREV (Capstan reversed). The maximum current input of the motor is limited to 1 A. Typical values for the PLAY mode are 0.2...0.3 A.

5. Threading motor driver :

The TMO driver is constructed as a bridge circuit and includes a dual power opamp L2722. The element can supply an output current of +/-1 A. It contains short circuit and thermal overload protection and integrated flyback diodes at the outputs. The output current is limited to approx. 0.7 A by the internal resistance of the threading motor (normally 18 Ohm) (start-up or motor block).
A Boucherot element (1E5, 100 nF) is contained between the IC outputs (pin 1 and 3), suppressing a 3 MHz oscillation tendency of the output stage. One half of the bridge is controlled by the TMO line and operates as a comparator. The other half is an amplifier integrator with Vu = 3.9 times. A change of input voltage (THIO) between 0 and 5 V causes a voltage variation between 0 V and near operating voltage at the output. In case of 50% adjustment (THIO = 2.5 V), pin 3 has approx. 7 V. The capacitor in the negative feedback of the opamp filters the PWM frequency of approx. 21.5 kHz. At POR, the TVC outputs "L" at line THIO, whilst the TMO is "H". To ensure that no current flows in the motor during the POR pulse, the above polarity must be maintained. This prevents damage to the motor during longer control and blocking periods. However, this circuit also has a negative consequence. Residual voltages can be passed to the IC input from still applied 14 V voltages in case of failure of the 5 V supply (i.e. activation of Pos1402 fuse). These countertrip the comparator and the opamp leading after approx. 1 minute to a short-circuit in the blocked threading motor. To avoid this problem, a separate reference voltage divider [3445, 3446] is provided for the comparator. Both L2722 [7440] outputs will now enter the "common-mode" in the above case.

6. Analogue interface to the TVC :

The following analogue levels are passed to the TVC internal A/D converter :

• TRIV	Tracking Information Video.
• TAE/TAS	Tape End/Tape Start Detection.
• I/R	Linked information from INIT and record protection.
• AGC	Automatic Gain Control

7. End of tape - LED control :

The LED current is switched by two transistors. The ON-time is approx. 1 msec for an ON/OFF- ratio of 0.09.
The LED current is normally 180 mA. To avoid any radiation or spreading of interference caused by the relatively large pulsed current throughout the entire set, the LED is fed from the +14M1.

8. Evaluation of drive switch :

The drive contains two switches :

• INIT	Initialisation switch
• RECP	Record protection

The condition of both switches can be read with a single line (I/R) into one of the analogue inputs of the TVC (pin 53). For this, all switch outputs whose level may be "H" (5 V) or "L" (0 V) are connected via a resistor network. Every possible switch condition combination corresponds thus to a certain direct voltage at line I/R.

FAULT LOCATING HELP FUNCTIONS

Erasing the EEPROM

- Disconnect from mains
- Push and hold down the Standby key, reconnect to mains and keep the Standby key depressed for a further 3 sec.

All EEPROM data will then be erased and initialised (timer and transmitter channels). The internal processor Ram is also erased but the option codes, deck parameters and adjustment values are maintained.

After changing the EEPROM or MOBO

the following steps must be carried out:

Step 40:	Option code input
Step 51:	Setting the gap positions
Step 52:	Studio Picture control' adjustment
Step 53:	Input of clock correction
Step 60:	Level adjustment StereoTDA9840
Step 61:	Adjustment channel separation Stereo TDA9840
Step 62:	AdjustmentAudio Linear Playback LevelTDA9614H
Step 99:	Clock frequency output

Head disc cleaning

With the recorder set to PLAY, the video heads can be cleaned by pressing the tracking key on the remote control for more than 5 sec. The recorder then moves to STOP and the video head cleaning roll is pressed to the running head disc for 10 sec. The recorder returns to PLAY automatically.

2. Service test program

2.1 Introduction

The software program for the control, deck and operating microprocessors includes a service test program. It was divided into the following steps, with the following 'modes'

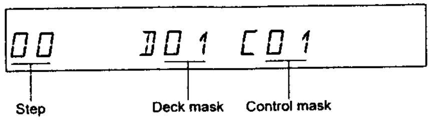
Step 00:	Display of mask version number
Step 01:	Checking the drive positions
Step 02:	Display of the deck - error codes
Step 03:	Deck - sensors and manual tracking
Step 04:	Display of operating hours counter
Step 10:	Operation without drive - dummy mode
Step 40:	Option code input
Step 51:	Setting the gap positions
Step 52:	Studio Picture control' adjustment
Step 53:	Input of clock correction
Step 60:	Level adjustment StereoTDA9840
Step 61:	Adjustment channel separation StereoTDA9840
Step 62:	AdjustmentAudio Linear Playback LevelTDA9614H
Step 99:	Clock frequency output

In the service test program, all drive functions apart from the channel search and channel change mode can be carried out. The program position set before entering the service test program is maintained.

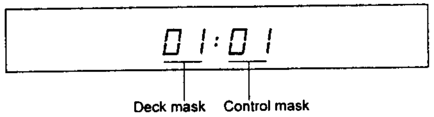
2.2 Activating the service test program

Press and hold down the STOP key on the remote control. Then press the PLAY key on the recorder and keep it depressed for at least 5 sec. The STOP key on the remote control may be released whilst the PLAY key on the recorder is pressed.
The service test program can be selected in any operating mode apart from the channel search, install, clock set-up and cassette length selection mode. The recorder and all drive functions are fully operational in the service mode.

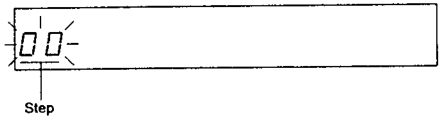
Alphanumerical display (O45):



Numerical display (OE1):

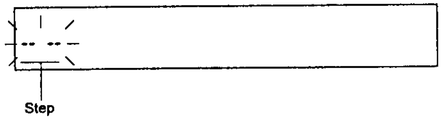


By pressing the SELECT key on the remote control, all step modes may be left, and the currently selected step number appears and flashes.



Other service steps are selected with the UP and DOWN keys or the numerical remote control keys. By pressing the SELECT key on the remote control whilst the Step is flashing, the respective mode can be entered or left whilst the step is flashing.

If a step is selected to which no mode is assigned the displays shows - - and flashes.

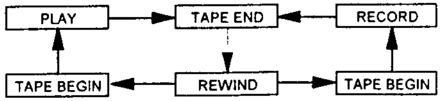


To leave the service program, press the STAND-BY key or disconnect recorder from mains.

2.3 Service mode functions

Endurance test

In the service test program, the recorder can be endurance tested. For this, use a cassette and activate "PLAY" or "REC". The function is then repeated continuously. In RECORD, the recorder does not move to EJECT at the tape end, but to REWIND, after which it starts to RECORD again. This test serves to detect intermittent faults. The last error is stored in the EEPROM. (The fault remains stored even after a power failure).
The endurance test is ended by pressing STOP or leaving the service test program.

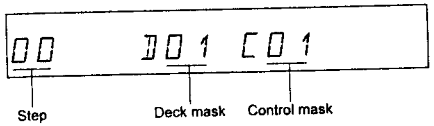


2.4 Description of steps with modes:

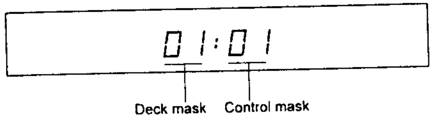
Step 00: Display of mask version number

After activating the service test program, step 00 with the mask version number is automatically displayed. In the 2µP concept, both microprocessors are shown in a display.

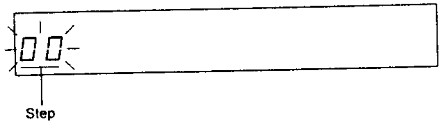
On alphanumerical O45 displays, the following message appears:



On numerical OE1 displays, only the following message can appear:



The mode can be left again by pressing the SELECT key on the remote control. The currently selected position number appears and flashes on the display.



A step between 00 and 99 can now be selected.

Step 01: Checking the drive positions

By pressing the SELECT key, once Step 01 is flashing, the drive position appears on the display.
The FTA signal from the light barriers which controls the speed of the threading motor is used to check the drive condition.
The drive position is shown as 2-digit hex. number by counting the FTA pulses on the display.

(e.g. 07 = Eject)

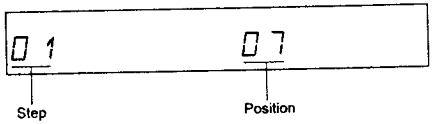
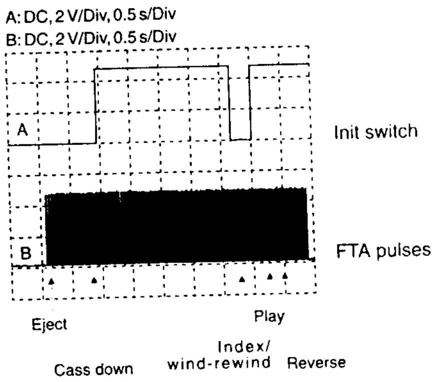


Table of drive positions:

Status	Position (FTA dec)	Display (FTA hex)
Eject	7 +2/-2	07 +2/-2
Index	191 +0/-2	BF +0/-2
Stop	200 +4/-4	C8 +4/-4
Play	211 +4/-4	D3 +4/-4 with Swing Search
	213 +4/-4	D5 +4/-4 no Swing Search
Reverse	237 +2/-0	ED +2/-0

Function of the Init switch:
The diagram shows the function of the Init switch, depending on the position of the drive. The number of FTA pulses is important for the position of the drive.



Step 02: Display of the deck error codes

By pressing the SELECT key, whilst Step 02 is flashing, the deck error code is shown on the display.

Checking the drive function
Threading and unthreading time
The signal of the photoelectric barrier which controls the revolutions of the threading motor is used as a reference for the threading and unthreading time.

Stopping of left or right winding disk
The tacho signals of the left (WTL) and right (WTR) winding disks are used as a control reference.

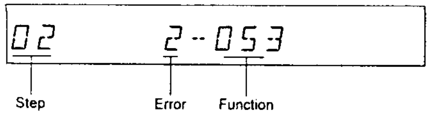
Stopping of axial head motor
This is monitored with the PG/FG signal. The signal is discharged from the e.m.f. of the non-conducting spools of the axial head motor, showing the position of the head cylinder.

Capstan motor fault
This is monitored with the FGD signal.

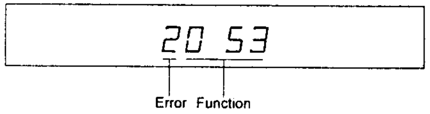
If one of the above sensor signals is not available, the recorder tries to put the lift in the "EJECT" position.

Explanation of deck error codes and deck error status
The last error code is stored and remains in the EEPROM, even if the recorder is disconnected from the mains.
The error code can be erased by pushing the CLEAR button on the remote control during the service mode.

Alphanumerical O45 display:



Numerical OE1 display:



(e.g.: Error 2 = Capstan fault)

0	no error
1	threading error
2	no capstan pulses
3	tape broken
4	no pulses left reel
5	no pulses right reel
6	head motor error

The 3 digits on the right represent the deck error condition:
(e.g.: 053 = for Play)

Functiontable:

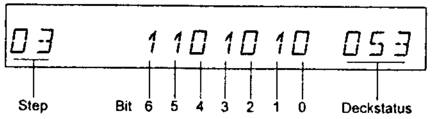
012	Standby	114	VISS write	211	Slowmotion 1/24
014	Autotracking	115	Viss erase	212	" " 1/14
031	Play-3	125	Tuner - Stopout	215	" " 1/7
034	Slow_reverse	126	Auto Remain Funct.	216	" " 1/2
041	Still Picture	130	ATTS Function	217	" " -1/24
042	Fast	168	Frame+	218	" " -1/14
044	Play-9	169	Frame-	219	" " -1/7
045	Eject	170	Play-11	220	" " -1/2
046	Play9	171	Play-7	222	Edit Record
047	Play-1	172	Play-5	223	Align of Gap
048	Pause	173	Play5	238	Pause
050	Rewind	174	Play7	239	SPC align
052	Wind	175	Play11	246	Edit Pause
053	Play	196	Tuner - Eject	247	Slow motion 1/10
054	Stop out	197	Standby Eject	248	" " 1/18
055	Record	199	Audio Dubbing	249	" " -1/10
112	Index next	202	Audio Dubb. Pause	250	" " -1/18
113	Index previous	206	Reset Tapecounter	253	Key Released

The error code can be reset with the CLEAR key.

Step 03: Deck sensors and manual tracking

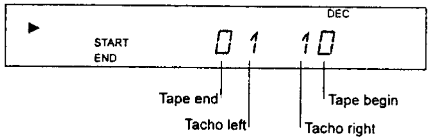
By pressing the SELECT key whilst step 03 is flashing, the deck sensors will be displayed in one digit as either 1 or 0.

Alphanumerical display O45:



Bit 0 .... Tape begin
Bit 1 .... Tacho right
Bit 2 .... Threading tacho (butterfly)
Bit 3 .... Record protection switch
Bit 4 .... Init switch
Bit 5 .... Tacho left (Bit 5 is set to 1 for 2µP, and non TURBO sets)
Bit 6 .... Tape end

Numerical display OE1:



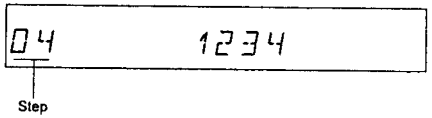
■ ● ◀ ▶ are used to display the deck status.
▶ flashes during tracking
START init switch
END record protection
DEC threading tacho

In the service test program, the tracking is always in the centre position.
Press the TRACKING key:
Only in this step can the value for the necessary tape running setting be changed using the UP / DOWN keys.
After leaving the mode with the SELECT key, the tracking value always resets itself to the middle position and cannot be changed.

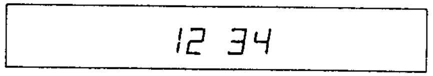
Step 04: Display of the operating hours counter:

By pressing the SELECT key whilst step 04 is flashing, the operating hours counter shows how many hours the head disk has turned. The hours are displayed as a 4-digit decimal number.

Alphanumerical display O45:



Numerical display OE1:

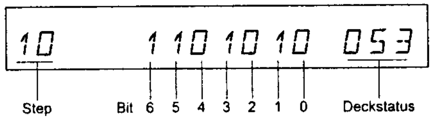


Step 10: Operation without drive - dummy mode

Before activating this mode with the SELECT key, the recorder must be in EJECT position.

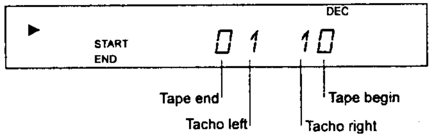
Enter the mode by pressing the SELECT key. The motors are then switched off and the sensors will be ignored by the deck microprocessor. The drive can now be dismantled from the motherboard (see dismantling instruction). Only install drive if recorder is disconnected from mains. For signal tracking, the recorder can be set to all drive conditions, i.e. signal electronic, audio and IO processing are switched to the respective operating mode. In the 2 µP concept, the current condition is shown in the display as a 3-digit BCD number (see step 03 list).

Alphanumerical display O45:



bit0.... tape begin
bit1.... tacho right
bit2.... threading tacho (butterfly)
bit3.... record protection switch
bit4.... init switch
bit5.... tacho left (not for 2µP)
bit6.... tape end

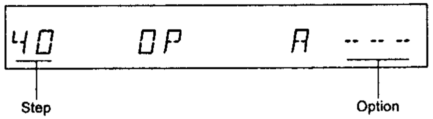
Numerical display OE1:



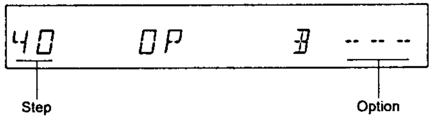
■ ● ◀ ▶ are used to show the deck status
▶ ... flashes during tracking
START ... init switch
END ... record protection
DEC ... threading tacho

Step 40: Option code input

If, as part of repair work, a new EEPROM is installed, it has to be initialised.
By pressing the SELECT key whilst step 40 is flashing, option A appears in the display.

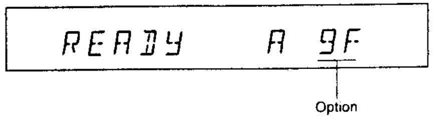


The available options can be selected with the UP and DOWN keys.



By entering a 3-digit decimal code (see type sign on recorder), the correct features are set. After pressing the STORE key on the recorder, or OK, the entered code is saved and shown on the display for approx. 5 sec. in hex. format.

Code check:
By pressing the STORE key on the recorder, or OK (for 3 µP), the code of the EEPROM in the current position is shown in the display for approx. 5 sec. in hex. format.



By using the CLEAR key on the remote control, incorrectly entered values can be cancelled (µP sets default base configuration).

Adjustments in the service test programm

Step 51: Setting the gap position

Purpose: To determine the head changeover pulse during playback.

Symptom if incorrectly set:
Head changeover fault and/or vertical picture flickers.

- Enter the service test program and, whilst step is flashing, enter step number using the numerical keys.
- Insert test cassette (i.e. 4822 397 30103) with standard video signal into VCR and press PLAY.
- By pressing the SELECT key whilst step 51 is flashing, the automatic adjustment is triggered and stored in the EEPROM .

After correct adjustment, the recorder switches automatically to STAND BY.
In case of unsuccessful adjustment, the recorder ejects the test cassette.

Causes : Incorrect standard video signal.
Scanner defect.
Microprocessor defect .

Step 52: "Studio Picture control" adjustment

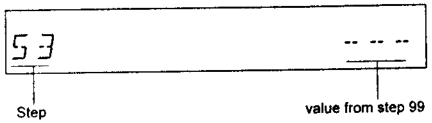
If, as part of repair work, a new EEPROM is installed, it must be newly initialised for the Studio Picture control feature.

- Video signal via Scart or aerial
  (Input signal via Scart or RF should show a constant level grey or red image during the adjustment).
- Enter the service test program and, whilst the step is flashing, input the step number using the numerical keys.
- Insert cassette (not SVHS cassette).
- Press the PLAY key.
- By pressing the SELECT key whilst step 52 is flashing, the recorder will make a recording in SP mode (approx. 4 sec.) and in LP mode (approx. 4 sec.), rewinds and carries out a playback with automatic adjustment.
- After the successful adjustment, the VCR returns to STAND BY mode!
  (In case of incorrect adjustment, the recorder ejects the cassette)

Step 53: Inputting the clock correction

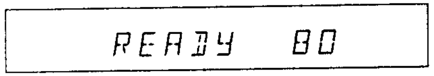
Before carrying out step 53, the correction value must be established in step 99.

By pressing the SELECT key whilst step 53 is flashing, the display shows:



Using the numerical keys on the remote control, the correction value established from step 99 is entered as a 3-digit figure (value must be between 0 and 255).

By pressing STORE or OK, the value is stored in the EEPROM so that the VCR can automatically correct the time.



The entered value is shown in the display for approx. 5 sec. in hex. format. The default value for the new EEPROM is 80 hex. (128 dec).

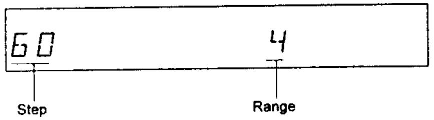
Step 60: Level adjustment Stereo TDA9840

Purpose: Adjustment of amplification of the stereo demodulator TDA9840 [7780] on Subprint PAF

Symptom if incorrectly set:
Sound is too low or too loud

TP	ADJ.	MODE	INPUT
Pin 1 of Scart 1 (Audout)	refer to description	Stop Stereo	RF - input,white picture,1kHz sound only on right channel +/-27kHz deviation
TAPE		**MEAS. EQ.**	**SPEC.**
		AC Millivoltmeter	500mV$_{RMS}$ ±50mV

When pressing the button SELECT with step 60 flashing the display will show e.g.:



- Connect the millivoltmeter to Scart1 Pin1 (Audio out right).
- The level on Scart 1, Pin1 (Audio out) can be adjusted to set value with UP (value increases) or DOWN (value decreases). (The amplitude changes 0,5 dB each time you press the key). The range is shown in the display with numbers between 1-9.
- The value is automatically stored in the EE-PROM each time the button is pressed.

After exit of this step with SELECT the last value will be stored in the EE-PROM.

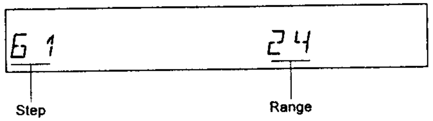
Step 61: Adjustment channel separation Stereo TDA9840 (not needed for NICAM)

Purpose: Adjustment of channel separation of the stereo demodulator TDA9840 [7780] on Subprint PAF.

Symptom if incorrectly set:
Cross-talk between left and right channel..

TP	ADJ.	MODE	INPUT
Pin 3 of Scart 1 (Audout left)	refer to description	Stop Stereo	RF - input,white picture,1kHz sound only on right channel +/-27kHz deviation
TAPE		**MEAS. EQ.**	**SPEC.**
		AC Millivoltmeter or Oszilloscope	lowest value

When pressing the button SELECT with step 61 flashing the display will show e.g.:



- Connect Millivoltmeter to Scart1 Pin3 (Audio out left).
- The noise amplitude on Scart 1 Pin3 (Audio out left) can be adjusted to the lowest value by pressing UP(+) or DOWN (-) (The amplitude changes 0,1 dB each time you press the button). The range is shown in the display with numbers between 0...49.
- The value is automatically stored in the EE-PROM each time the button is pressed.

After exit of this step with SELECT the last value will be stored in the EE-PROM.

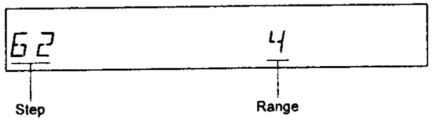
Step 62:Adjustment Audio-Linear-Playback Level TDA9614H [7100]:

Purpose: Adjustment of amplification of the audio linear playback level on Subprint PAF.

Symptom if incorrectly set:
The linear sound is too low or too loud.

TP	ADJ.	MODE	INPUT
Pin 1 of Scart 1 (Audout)	refer to description	SP Self-recording and Playback	(AUDIO IN E1) 700mV$_{RMS}$ 1kHz
TAPE		**MEAS. EQ.**	**SPEC.**
Blank Tape		AC Millivoltmeter	500mV$_{RMS}$ ±50mV

When pressing the button SELECT with step 62 flashing the display will show e.g.:



- Make a recording of the audio signal external of E1.
- Connect the millivoltmeter to Scart1 Pin1(Audio out) and play the recording back.
- The level on Scart 1, Pin1 (Audio out) can be adjusted to set value with UP (value increases) or DOWN (value decreases). (The amplitude changes 1 dB each time you press the key). The range is shown in the display with numbers between 0...15.
- The value is automatically stored in the EE-PROM each time the button is pressed.

Step 99: Clock frequency output

After activation with SELECT, the display is switched to dark and all functions on the recorder are blocked.
At pin 19 (HEST), of connector 1921(PDC), the uncorrected clock frequency 2048 Hz is always output.
Use a calibrated counter (minimum 6 digit resolution) to measure the output frequency and note down the value (f_{mess}).

Determining the deviation (in ppm):

f_{mess}.....measured frequency
f_{nom}..... Set frequency (2048,00 Hz)

Deviation = $1x10^6 x (f_{mess} - f_{nom}) / f_{nom}$

Determining the correction value for step 53:

Correction value = Deviation / 0.763 + 128 (round to whole numbers)

Example:

f_{mess}=2047.97Hz
f_{nom}=2048.00Hz

Deviation= $1x10^6$ x (2047.97 - 2048) / 2048 = -14.648

Correction value = -14.648 / 0.763 + 128 = 108.80 = **109**

The calculated **correction value** must be between 0 and 255 (otherwise change quartz), and must be entered in step 53 and stored.

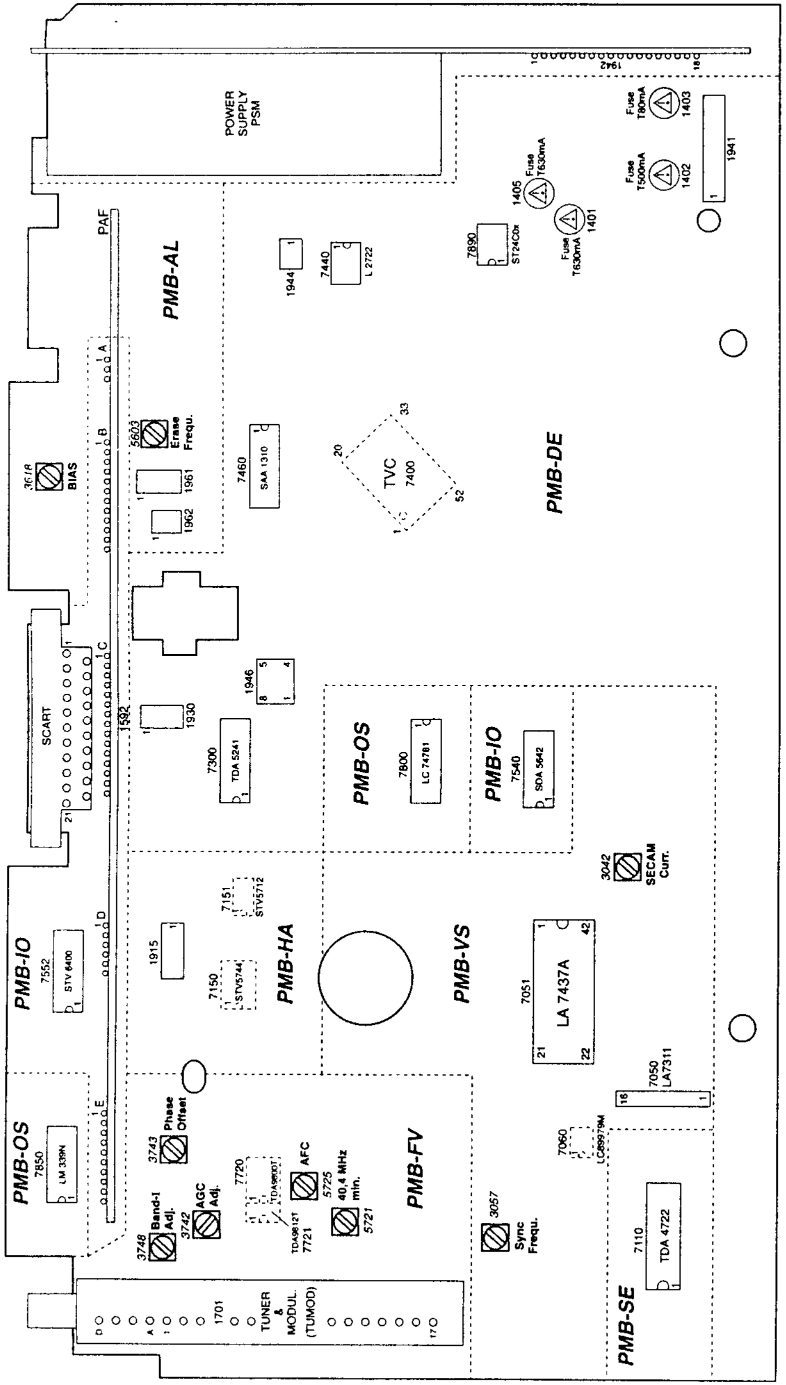
This step can only be left by a mains reset, after which the service test program has to be entered again to call up step 53.

Hexadecimal - Decimal Conversion Table :

②

Hex lower digit / Hex upper digit	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	000	001	002	003	004	005	006	007	008	009	010	011	012	013	014	015
1	016	017	018	019	020	021	022	023	024	025	026	027	028	029	030	031
2	032	033	034	035	036	037	038	039	040	041	042	043	044	045	046	047
3	048	049	050	051	052	053	054	055	056	057	058	059	060	061	062	063
4	064	065	066	067	068	069	070	071	072	073	074	075	076	077	078	079
5	080	081	082	083	084	085	086	087	088	089	090	091	092	093	094	095
① 6	096	097	098	099	100	101	102	103	104	105	106	107	108	109	110	111
7	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
8	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143
9	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
A	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
B	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191
C	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207
D	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
E	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
F	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255

For example: If the indication is `6D` (upper digit is `6` and lower digit is `D`), a decimal value of 109 is optained from the intersection of 1 and 2 in the above table.

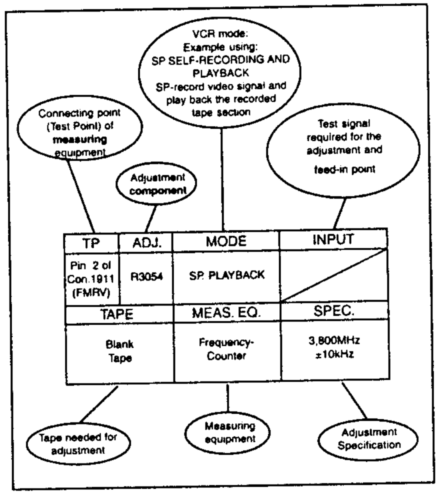

1942
1
18
POWER SUPPLY PSM
Fuse T80mA
1403
Fuse T500mA
1402
1941
Fuse T630mA
1405
Fuse T630mA
1401
7890
ST24C0x
PAF
PMB-AL
1944
7440
L 2722
1 A
1 B
5603
Erase Frequ.
3618
BIAS
1961
1962
7460
SAA 1310
TVC
7400
20
33
52
PMB-DE
1 C
SCART
21
1592
1930
1946
7300
TDA 5241
PMB-OS
7800
LC 74781
PMB-IO
7540
SDA 5642
3042
SECAM Curr.
1 D
PMB-IO
7552
STV 6400
1915
7151
STV5712
7150
STV5744
PMB-HA
PMB-VS
7051
LA 7437A
1
42
21
22
7050
LA7311
16
1 E
PMB-OS
7850
LM 339N
3743
Phase Offset
3748
Band-I Adj.
3742
AGC Adj.
7720
TDA9800T
TDA9812T
7721
AFC
5725
40,4 MHz min.
5721
PMB-FV
3057
Sync Frequ.
7060
LC89979M
7110
TDA 4722
PMB-SE
1701
TUNER & MODUL. (TUMOD)
17

ADJUSTMENT INSTRUCTIONS

Test equipment:

1. Dual-trace oscilloscope
   Voltage range : 0.001 ~ 50 V/div
   Frequency : DC ~ 50 MHz
   Probe : 10:1, 1:1
2. DVM (Digital voltmeter)
3. Frequency counter
4. Sinus generator
   Sinus : 0 ~ 50 MHz
5. Test pattern generator
6. VHS Alignment Tape 4822 397 30103

How to read the adjustment procedures:


VCR mode:
Example using:
SP SELF-RECORDING AND PLAYBACK
SP-record video signal and play back the recorded tape section
Connecting point (Test Point) of measuring equipment
Adjustment component
Test signal required for the adjustment and feed-in point
Tape needed for adjustment
Measuring equipment
Adjustment Specification

TP	ADJ.	MODE	INPUT
Pin 2 of Con.1911 (FMRV)	R3054	SP. PLAYBACK	
TAPE		MEAS. EQ.	SPEC.
Blank Tape		Frequency-Counter	3,800MHz ±10kHz

Power supply - PSM (PS)

1. Setting the output voltage +5V :

Purpose: To set the correct supply voltage.

Symptom, if incorrectly set:
VCR functions are not operating correctly.

TP	ADJ.	MODE	INPUT
Pin 16 of Con. 1509 (+5A)	R3078	Playback	
TAPE		MEAS. EQ.	SPEC.
Any tape		DC Voltmeter	5,3V ±0,03V

Video signal processing - PMB (VS)

1. Sync level frequency (3057) :

Purpose: To maintain the recording interchangeability by adjusting the sync frequency and deviation.

Symptom, if incorrectly set:
Record interchangeability is insufficient.

TP	ADJ.	MODE	INPUT
Pos. 9013 (FMRV)	R3057	Record Preset E1	No input signal
TAPE		MEAS. EQ.	SPEC.
Blank Tape		Frequency-Counter	3,800MHz ±10kHz

2. Chrominance record current adjustment:

Purpose: To set the optimum record chrominance level.

Symptom, if incorrectly set:
If the record level is too high, beats may appear on the picture.
If the level is too low, the colour may be degraded

SECAM Chrominance record current adjustment (3042)

Before commencing adjustment, connect pin 2 of IC7051 to pin 13 (+5V).

TP	ADJ.	MODE	INPUT
Pos 9013 (FMRV)	R3042	Record of Preset E1	(VIDEO IN E1) Red Picture 75% Saturation
TAPE		MEAS. EQ.	SPEC.
Blank Tape		Oscilloscope Video Pattern Generator	**X**=42mV$_{pp}$ (-17dB) relative to the luminance signal) see Fig.1

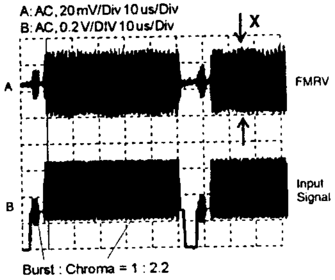


Fig. 1

Front End - PMB (FV)

1. AFC Adjustment:

Purpose: Correct adjustment of demodulator AFC - circuit

Symptom, if incorrectly set:
Bad or disturbed TV channel reception.

1.1 PAL - AFC Adjustment (5725) :

TP	ADJ.	MODE	INPUT
IC 7720 Pin 15	L5725	E to E	38,9MHz 500mV$_{pp}$ at Tuner 1701 Pin 17
TAPE	**MEAS. EQ.**		**SPEC.**
	DC Voltmeter Frequ. Generator		2,5V ±0,2V

1.2 PAL/SECAM - AFC Adjustment (5725) :

TP	ADJ.	MODE	INPUT
IC 7723 Pin 20	L5725	E to E	38,9MHz 500mV$_{pp}$ at Tuner 1701 Pin 17
TAPE	**MEAS. EQ.**		**SPEC.**
	DC Voltmeter Frequ. Generator		2,5V ±0,2V

1.3 SECAM band 1 - AFC Adjustment(3748) :

Before commencing adjustment:

- Connect pin 7 of IC 7721 (PSS) to ground (activates SECAM)
- Connect collector of 7726 to ground (activates band I) .

TP	ADJ.	MODE	INPUT
IC 7723 Pin 20	R3748	E to E	33,9MHz 500mV$_{pp}$ at Tuner 1701 Pin 17
TAPE	**MEAS. EQ.**		**SPEC.**
	DC Voltmeter Freq. Generator		2,5V ±0,2V

2. Phase offset Adjustment (3743) :

After replacement of the IC TDA9800T (7720), the potentiometer pos. 3740 has to be removed from the motherboard. The demodulator IC is automatically adjusted to a default value.

3. HF - AGC Adjustment (3742) :

Purpose: Set amplifier control.

Symptom, if incorrectly set:
Picture jitter if input level is too low and picture distortion if input level is too high.

TP	ADJ.	MODE	INPUT
Tuner 1701 Pin 17	R3742	Set tuned to channel 27	4,5mV(74dBµV) on aerial input PAL white picture, audio IF on, no modulation
TAPE		**MEAS. EQ.**	**SPEC.**
		Oscilloscope Video Pattern Generator	550mV$_{pp}$ +/-50mV (use a 10:1 probe)

Audio linear - PMB (AL)

1. Adjusting the erasing frequency (5603) :

Purpose: To set the correct recording erasing frequency.

Symptom, if incorrectly set:
Erasing frequency or its harmonics cause audio faults.

TP	ADJ.	MODE	INPUT
wire 9611 (BIAS-R)	L5603	Set tuned to channel 27 Record	PAL white picture, audio IF and modulation on
TAPE		**MEAS. EQ.**	**SPEC.**
Blank Tape		Frequency Counter	70kHz ±10kHz

2. Adjustment of bias current (3618) :

Purpose: To set the optimum record bias current.

Symptom, if incorrectly set:
If the audio level is too high, the higher frequencies of the linear sound are too low.
If the level is too low, the higher frequencies are too strong and sound distortions inrease.

TP	ADJ.	MODE	INPUT
R3600 (difference measurement)	R3618	Set tuned to channel 27 Record	PAL white picture, audio IF and modulation on
TAPE	**MEAS. EQ.**		**SPEC.**
Blank Tape	AC Millivolmeter		15mV$_{RMS}$ (70kHz)

Checking the 'bias' adjustment:

After the bias has been adjusted to the indicated level, record some music, play back the recording, and adjust the audio switch to "MONO".
Only use brand name cassettes, but not chrome dioxide tapes.
Check if sufficient treble is reproduced and for any audio distortion. In case of insufficient treble, reduce 'bias' current a little. In case of excessive distortion, increase 'bias' current a little.

Software adjustments in the Service test program

Deck electronics - PMB (DE)

1. Software adjustment of gap positions:

Information about this adjustment is contained in the Fault Locating document, Chapter 2-17, and in the service test program in Step 51.

2. "Studio Picture control" adjustment:

Information about this adjustment is contained in the Fault Locating document, Chapter 2-17, and in the service test program in Step 52.

Stereo Modulator - PAF (SD)

1. Level adjustment Stereo TDA9840 [7780]

Information about this adjustment is contained in the Fault Locating document, Chapter 2-17, in the service test program in Step 60.

2. Adjustment channel separation Stereo TDA9840 [7780]

Information about this adjustment is contained in the Fault Locating document, Chapter 2-17, in the service test program in Step 61.

Audio linear - PAF (AF)

1. Audio-Linear-Playback Level Adjustment TDA9614H [7100]

Information about this adjustment is contained in the Fault Locating document, Chapter 2-17, in the service test program in Step 62.

Operating panel - PDC (DC)

1. Clock frequency adjustment :

Purpose: Setting the exact clock function.

Symptom, if incorrectly set:
The clock is too fast or too slow.

In the Paolina range, the clock is corrected with a software correction factor.
Information about this adjustment is contained in the Fault Locating document, Chapter 2-17, in the service test program in Steps 53 and Step 99.

List of abbreviations

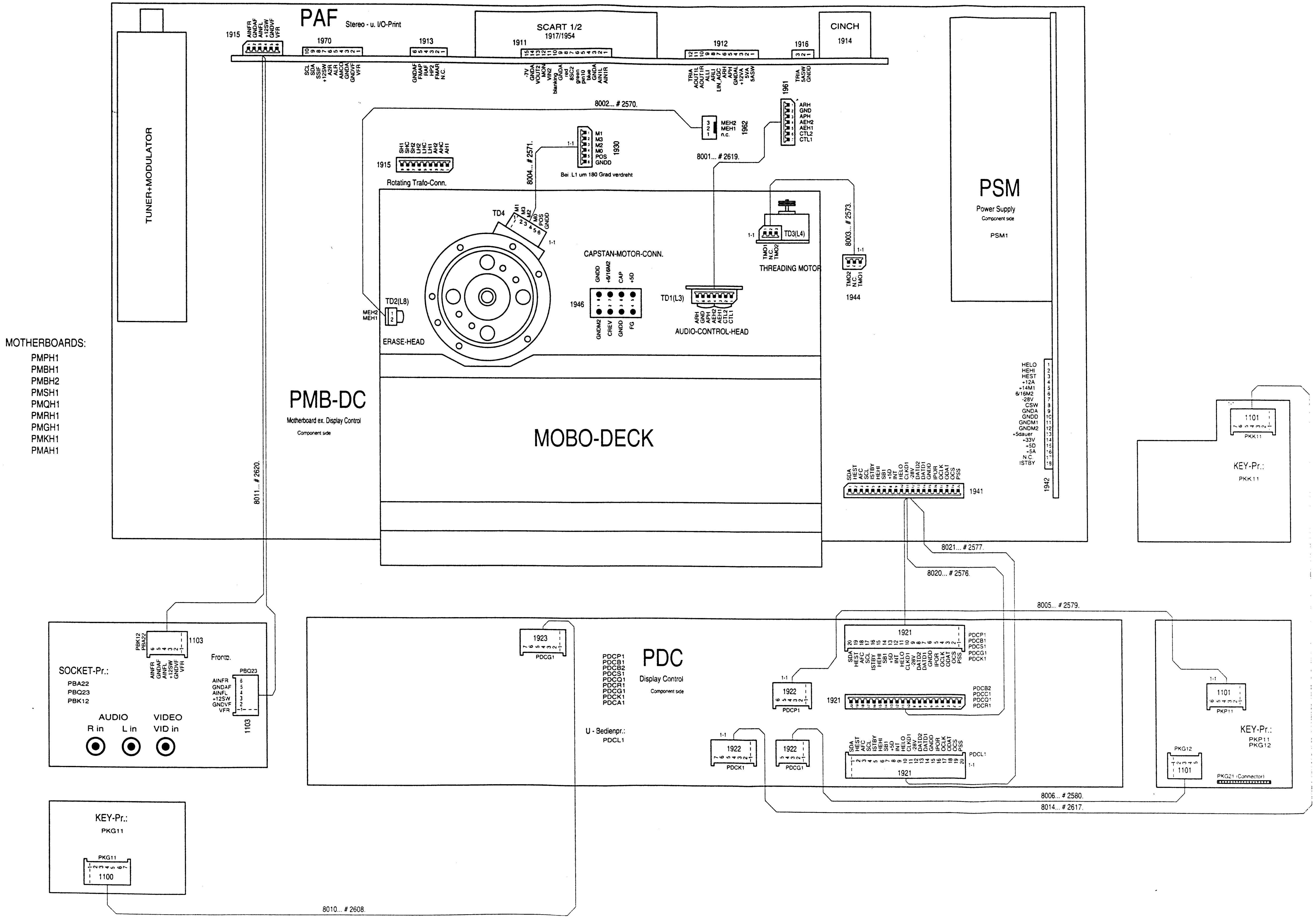
Signal	Description	Application												
+12A	+12V analog	PS		DE			FV	IO	AL			AF		
+12SW	+12V analog, switched						FV	IO			SD	AF		
+12SW1	+12V analog, after coil 5703						FV							
+12V	+12V analog, switched, for socket board													SB
+14M1	+14V for threading- and headmotor	PS		DE										
+33V	+33V for tuner tuning voltage	PS		DE			FV							
+5A	+5V analog from power supply	PS		DE										
+5AS	+5V analog after fuse 1700										SD			
+5ASS	+5V analog after fuse 1700, after R3706										SD			
+5D	+5V digital after fuse 1402	PS		DE									DC	
+5D1	+5V digital after fuse 1402, after Coil 5400			DE										
+5DAUER	+5V permanent												DC	
+5EXT	Back up voltage												DC	
+5NIC	+5V analog, PAF-board										SD	AF		
+5VA	+5V analog, PAF-board											AF		
+5VS	+5V analog after fuse 1101											AF		
+6/16M2	Capstan motor supply, switched			DE										
-28V	-28V display supply	PS		DE				IO					DC	
-7V	-7V I/O-switches supply							IO				AF		
5ASW	+5V analog (< 6W switched)			DE	VS	SE	FV	IO		OS		AF		
5DDC	+5V digital, for Control board												DC	
5S	+5V from power supply	PS												
5VA	+5V analog after fuse 1401		HA	DE			FV	IO		OS		AF		
5VA1	+5V analog after coil 5000				VS									
5VA3	+5V analog after coil 5802									OS				
5VAF	+5V analog after coil 5727						FV							
5VPB	+5V playback				VS	SE								
5VSTBY	+5V permanent	PS												
8/17M	Capstan motor supply, switched	PS												
8SC1	Scart 1 pin 8 input/output			DE				IO						
8SC1H	Scart 1 pin 8 high level			DE										
8SC2	Scart 2 pin 8 input			DE				IO				AF		
A2R	Audio 2x right						FV	IO			SD			
AEH1/2	Audio erase head								AL					
AF1	Audio left from stereo decoder										SD	AF		
AF2	Audio right from stereo decoder										SD	AF		
AFC	Automatic frequency control			DE			FV						DC	
AGC	Automatic gain control			DE			FV							
AH1/2/C	Audio heads		HA											
AIN1L	Audio input scart 1, left							IO				AF		
AIN1R	Audio input scart 1, right							IO				AF		
AINFL	Audio left from Front connector											AF		
AINFR	Audio right from front connector											AF		
AL	Audio left													SB
ALLI	Audio left level indication			DE				IO				AF		
ALR	Audio left+right						FV	IO			SD			
AMCO	Audio to the modulator						FV	IO			SD	AF		
AOUT1L	Audio output from scart 2, left							IO				AF		
AOUT1R	Audio output from scart 2, right							IO				AF		
APH	Audio playback head							IO	AL			AF		
AR	Audio right													SB
ARH	Audio record head							IO	AL			AF		
ARLI	Audio right level indication			DE				IO				AF		
BLANKING	Blanking pulse RGB loopthrough							IO				AF		
BLUE	Blue signal between scart 1/2							IO				AF		
CAP	Capstan control voltage			DE										
CKPAL/1	Colour killer PAL			DE	VS									

Signal	Description	Application												
CLKD1	Serial bus clock			DE									DC	
CREV	Capstan reverse			DE										
CROT	Colour rotation on/off			DE	VS									
CSI	Colour system information			DE	VS	SE								
CSP	Chrominance secam playback				VS	SE								
CSR	Chrominance secam record				VS	SE								
CSW	6V/16V switching for capstan motor	PS		DE										
CSYNC/1	Composite sync pulse		HA	DE	VS	SE				OS				
CTL1/2	Control track signal			DE					AL					
DATD1/2	Serial bus data			DE									DC	
DO	Drop-out compensation on/off			DE	VS									
ENVC	Envelope comparator signal		HA	DE										
FFP	Feature frame pulse			DE	VS									
FG	Capstan tacho pulse			DE										
FGD	Capstan tacho pulse digital			DE										
FMAP	FM audio playback		HA					IO				AF		
FMAR	FM audio record		HA					IO				AF		
FMPV	FM video playback		HA		VS	SE								
FMRV	FM video record		HA		VS									
FOME	Follow Me (video signals equal)			DE						OS				
FSC	Colour subcarrier				VS					OS				
FTAD	Threading tacho digital			DE										
GND..	Ground													
GNDA	Ground analog	PS		DE			FV	IO			SD	AF		SB
GNDD	Ground digital	PS		DE							SD	AF	DC	
GNDM	Ground for motors	PS		DE										
GNDVID	Ground video											AF		
GNDVS	Ground signal electronics		HA					IO						
GREEN	Green signal between scart1/2							IO				AF		
HEHI	Heater for displaytube high	PS		DE									DC	
HELO	Heater for displaytube low	PS		DE									DC	
HEST	Heater voltage control signal	PS		DE									DC	
HP1	Head pulse video			DE										
HP2	Head pulse audio		HA	DE				IO				AF		
HSC	Head select control			DE										
HSC2	Colour phase switching for LP feature mode			DE	VS									
IEO	Main erase oscillator on/off			DE					AL					
INIT	Deck switch			DE										
INT	Interrupt			DE									DC	
INTSC	Inverse NTSC-playback			DE	VS									
IPBV	Inverse playback video			DE	VS									
IPOR	Inverse power on reset			DE									DC	
IRAF	Inverse record FM-audio			DE										
IREV	Inverse record video			DE	VS									
ISTBY	Inverse stand by												DC	
ISWS	Video-FM mute		HA	DE										
ITRICK	Comb filter by-pass during feature mode			DE	VS									
IWIND	Control pulse amplification low			DE										
LH1/2/C	Long play heads		HA											
LIN_AGC	Linear audio AGC											AF		
LPV	Longplay video			DE	VS									
MEH1/2	Main erase head								AL					
MES	Middle East secam			DE	VS									
MON	Monitor loop through scart 1/2							IO				AF		
MOT0-3	Head motor Control lines			DE										
NC/NU	Not connected	PS		DE									DC	
OCLK	OSD-bus clock			DE						OS			DC	

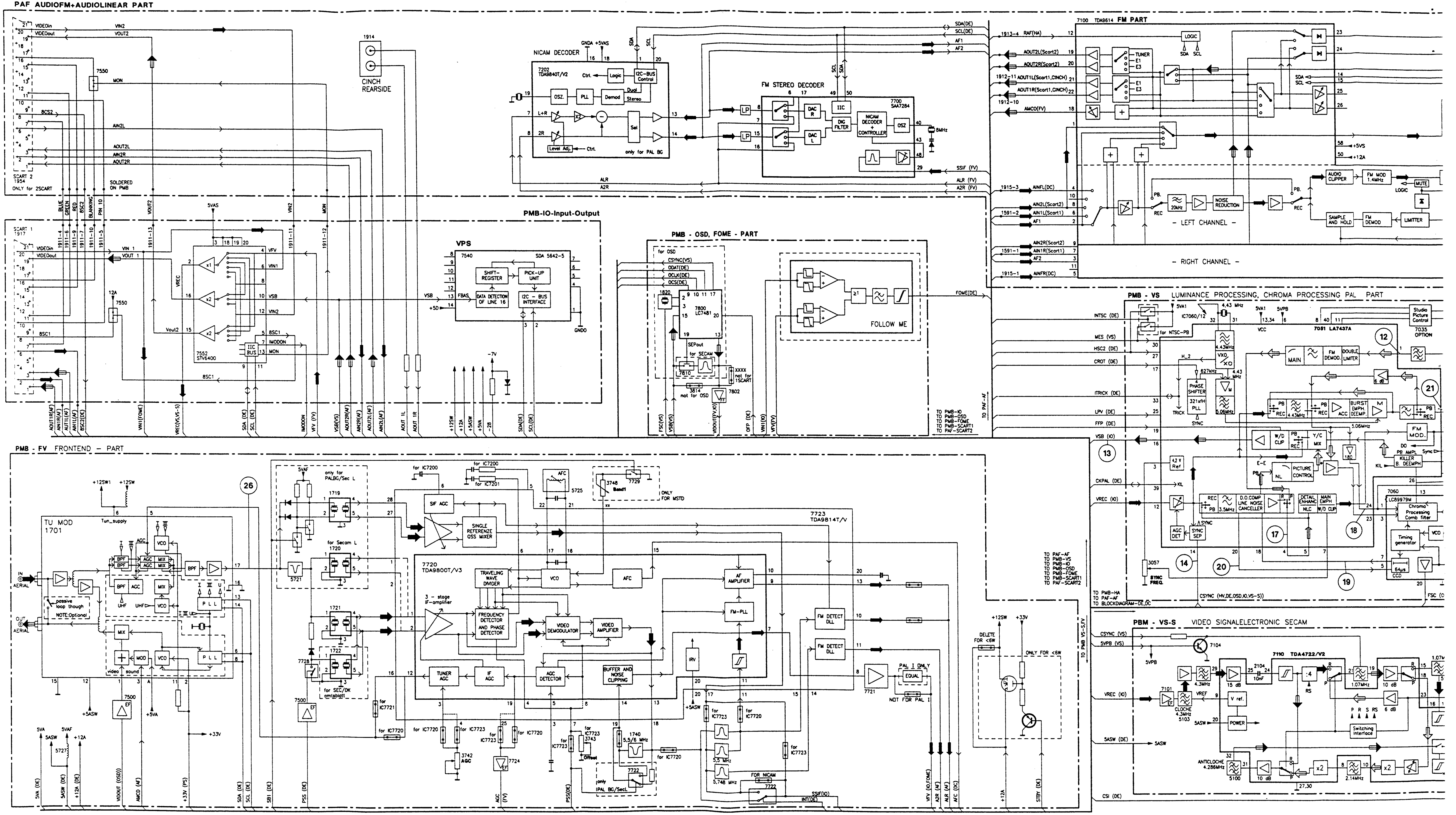
Signal	Description	Application												
OCS	OSD chip select			DE						OS			DC	
ODAT	OSD-bus data			DE						OS			DC	
OFP	Frame pulse			DE						OS				
PG/FG	Head wheel position/-speed			DE										
PIN10	Pin 10 scart 1/2							IO				AF		
POR	Power on reset			DE										
POS	Position pulse headwheel			DE										
PSS	PAL or secam-L			DE			FV						DC	
RAF	FM-audio record		HA	DE				IO				AF		
RECP	Record protection			DE										
RED	Red signal between scart 1/2							IO				AF		
REEL	Head wheel control			DE										
SB1	Secam band 1			DE			FV						DC	
SCCONI	Video-in on scart1 detection (Low P. Stdby on/off)												DC	
SCL	IIC bus clock			DE			FV	IO			SD	AF	DC	
SDA	IIC bus data			DE			FV	IO			SD	AF	DC	
SH1/2/C	Standard play heads		HA											
SPC1/2	Studio Picture Control			DE	VS									
SSIF	Second sound interfrequency						FV	IO			SD			
STBY	Low Power Stand-by on/off	PS		DE			FV							
SWIN	Head switching pulse		HA	DE										
SYNC	Control track pulse			DE										
TAE	Tape end detection			DE										
TAS	Tape start detection			DE										
THIO	Threading motor in/out			DE										
TMO	Threading motor on/off			DE										
TMO1/2	Threading motor connection			DE										
TRIA	Tracking information audio			DE				IO				AF		
TRIV	Tracking information video		HA	DE										
VFD	Video from front connector													SB
VFR	Video from front connector							IO			SD	AF		
VFV	Video from frontend						FV	IO		OS				
VH1/2/C	Video heads		HA											
VIDOUT	Video to output						FV	IO		OS				
VIN1	Video input scart 1							IO		OS				
VIN2	Video input scart 2							IO				AF		
VISS	Control sync pulse inversion			DE										
VOUT1	Video output scart 1							IO						
VOUT2	Video output scart 2							IO				AF		
VREC	Video record from I/O				VS	SE		IO						
VREF	Reference voltage					SE								
VSB	Video from signal electronics				VS			IO		OS				
W/R	Control track write/read			DE										
WTL	Wind tacho left			DE										
WTLD	Wind tacho left digital			DE										
WTR	Wind tacho right			DE										
WTRD	Wind tacho right digital			DE										

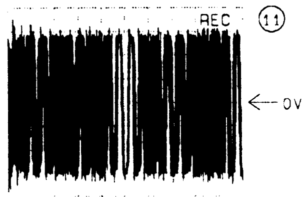
PS .. Power Supply
HA .. Head Amplifier
DE .. Deck Electronics
VS .. Video Signal Processing
SE .. Secam Processing
FV .. Frontend
IO ... In/Out
AL ... Audio Linear
OS .. On Screen Display
SD .. Stereo Decoder
AF .. Audio Processing
DC .. Display Control / Operating Panel
SB .. Socket Board / Front connectors

Wiring Diagram

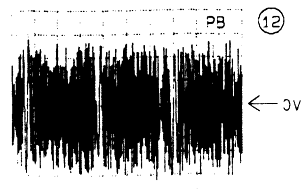

MOTHERBOARDS:
PMPH1
PMBH1
PMBH2
PMSH1
PMQH1
PMRH1
PMGH1
PMKH1
PMAH1
TUNER+MODULATOR
PAF Stereo - u. I/O-Print
1915 AINFR GNDAF AINFL +12SW GNDVF VFR
1970 SCL SDA SSIF +12SW A2R ALR AMCO GNDA GNDVF VFR
1913 GNDAF FMAP RAF HP2 FMAR N.C.
SCART 1/2
1917/1954
1911 -7V GNDA VOUT2 MON VIN2 blanking GNDA red 8SC2 green pin10 blue GNDA AIN1L AIN1R
1912 TRIA AOUT1L AOUT1R ALLI ARLI LIN_AGC ARH APH GNDAL +12VA 5VA 5ASW
1916 TRIA 5ASW GNDD
CINCH
1914
8002... # 2570.
1962 MEH2 MEH1 n.c.
1961 ARH GND APH AEH2 AEH1 CTL2 CTL1
8001... # 2619.
1915 SH1 SHC SH2 LH2 LHC LH1 AH2 AHC AH1
Rotating Trafo-Conn.
8004... # 2571.
1-1
1930 M1 M3 M2 M0 POS GNDD
Bei L1 um 180 Grad verdreht
TD4 M1 M3 M2 M0 POS GNDD
CAPSTAN-MOTOR-CONN.
1946 GNDD +6/16M2 CAP +5D GNDM2 CREV GNDD FG
TD1(L3) ARH GND APH AEH2 AEH1 CTL2 CTL1
AUDIO-CONTROL-HEAD
TD3(L4) TMO1 N.C. TMO2
THREADING MOTOR
8003... # 2573.
1944 TMO2 N.C. TMO1
TD2(L8) MEH2 MEH1
ERASE-HEAD
PSM
Power Supply
Component side
PSM1
PMB-DC
Motherboard ex. Display Control
Component side
MOBO-DECK
1942 HELO HEHI HEST +12A +14M1 6/16M2 -28V CSW GNDA GNDD GNDM1 GNDM2 +5dauer +33V +5D +5A N.C. ISTBY
1941 SDA HEST AFC SCL ISTBY HEHI SB1 +5D INT HELO CLKD1 -28V DATD2 DATD1 GNDD IPOR OCLK ODAT OCS PSS
8011... # 2620.
8021... # 2577.
8020... # 2576.
8005... # 2579.
KEY-Pr.:
PKK11
1101
SOCKET-Pr.:
PBA22
PBQ23
PBK12
1103 PBK12 PBA22 AINFR GNDAF AINFL +12SW GNDVF VFR
Frontb.
PBQ23 AINFR GNDAF AINFL +12SW GNDVF VFR
AUDIO
R in
L in
VIDEO
VID in
PDC
Display Control
Component side
PDCP1 PDCB1 PDCB2 PDCS1 PDCQ1 PDCR1 PDCG1 PDCK1 PDCA1
U - Bedienpr.:
PDCL1
1923 PDCG1
1922 PDCP1
1922 PDCK1
1922 PDCG1
1921 SDA HEST AFC SCL ISTBY HEHI SB1 +5D INT HELO CLKD1 -28V DATD2 DATD1 GNDD IPOR OCLK ODAT OCS PSS
PDCP1 PDCB1 PDCS1 PDCG1 PDCK1
PDCB2 PDCC1 PDCQ1 PDCR1
PDCL1
KEY-Pr.:
PKP11
PKG12
1101 PKP11
PKG12 1101
PKG21 (Connector)
8006... # 2580.
8014... # 2617.
KEY-Pr.:
PKG11
PKG11 1100
8010... # 2608.

Block Diagram Analog Part Paolina Basic HIFI

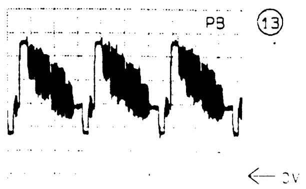

PAF AUDIOFM+AUDIOLINEAR PART
SCART 2 1954
ONLY for 2SCART
SOLDERED ON PMB
NICAM DECODER
7202 TDA9840T/V2
only for PAL BG
1914
CINCH REARSIDE
FM STEREO DECODER
7700 SAA7284
NICAM DECODER + CONTROLLER
7100 TDA9614 FM PART
LEFT CHANNEL
RIGHT CHANNEL
AUDIO CLIPPER
FM MOD 1.4MHz
NOISE REDUCTION
SAMPLE AND HOLD
FM DEMOD
LIMITTER
MUTE
LOGIC
PMB-IO-Input-Output
SCART 1 1917
7550
7552 STV6400
VPS
7540 SDA 5642-5
SHIFT-REGISTER
PICK-UP UNIT
DATA DETECTION OF LINE 16
I2C - BUS INTERFACE
PMB - OSD, FOME - PART
7800 LC7481
FOLLOW ME
PMB - VS LUMINANCE PROCESSING, CHROMA PROCESSING PAL PART
7081 LA7437A
7060 LC89979M
Chroma Processing Comb filter
PICTURE CONTROL
D.O.COMP LINE NOISE CANCELLER
PMB - FV FRONTEND - PART
TU MOD 1701
IN AERIAL
OUT AERIAL
passive loop though NOTE:Optional
7720 TDA9800T/V3
7723 TDA9814T/V
TRAVELING WAVE DIVIDER
FREQUENCY DETECTOR AND PHASE DETECTOR
VIDEO DEMODULATOR
VIDEO AMPLIFIER
SIF AGC
SINGLE REFERENZE OSS MIXER
AFC
AF AMPLIFIER
FM-PLL
FM DETECT DLL
TUNER AGC
IF AGC
AGC DETECTOR
BUFFER AND NOISE CLIPPING
PAL I ONLY
EQUAL
NOT FOR PAL I
FOR NICAM
DELETE FOR <6W
ONLY FOR <6W
PBM - VS-S VIDEO SIGNALELECTRONIC SECAM
7110 TDA4722/V2
Switching interface
CLOCHE 4.3MHz 5103
ANTICLOCHE 4.286MHz 5100
11
12
13
14
15
17
18
19
20
21
26



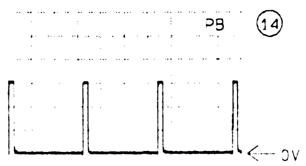
A AC 200mV/Div 500ns/Div
Transistor 7010 Basis



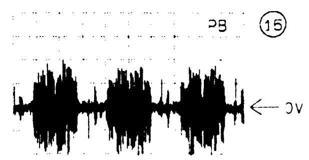
A AC 100mV/Div 20µs/Div
IC 7051 Pin 1



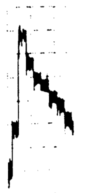
A DC 500mV/Div 20µs/Div
Resistor 7004 Basis



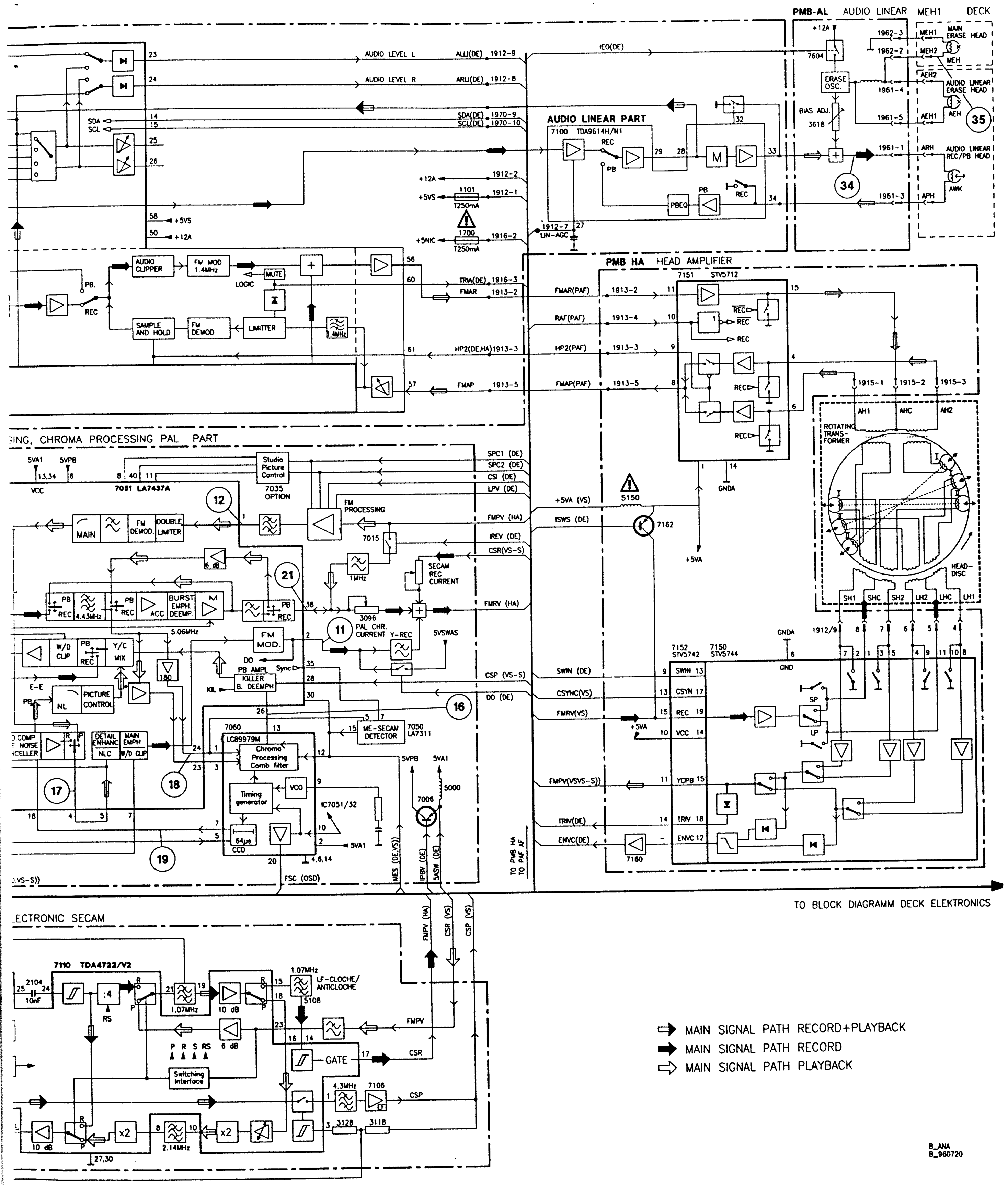
A DC 1 V/Div 20µs/Div
IC 7051 Pin 14

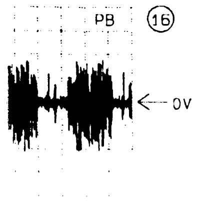


A AC 100mV/Div 20µs/Div
IC 7051 Pin 25

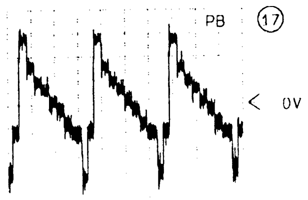


A AC
IC 705


PMB-AL AUDIO LINEAR MEH1 DECK
AUDIO LEVEL L
AUDIO LEVEL R
AUDIO LINEAR PART
7100 TDA9614H/N1
ERASE OSC.
BIAS ADJ.
MAIN ERASE HEAD
AUDIO LINEAR ERASE HEAD
AUDIO LINEAR REC/PB HEAD
T250mA
PMB HA HEAD AMPLIFIER
7151 STV5712
ROTATING TRANS-FORMER
HEAD-DISC
AUDIO CLIPPER
FM MOD 1.4MHz
MUTE LOGIC
SAMPLE AND HOLD
FM DEMOD
LIMITER
ING, CHROMA PROCESSING PAL PART
7051 LA7437A
Studio Picture Control
7035 OPTION
FM PROCESSING
SECAM REC CURRENT
PAL CHR. CURRENT Y-REC
FM MOD.
PB AMPL
KILLER B. DEEMPH
PICTURE CONTROL
7060 LC89979M
Chroma Processing Comb filter
Timing generator
VCO
IC7051/32
ME-SECAM DETECTOR
7050 LA7311
7152 STV5742
7150 STV5744
7162
7006
7160
TO BLOCK DIAGRAMM DECK ELEKTRONICS
LECTRONIC SECAM
7110 TDA4722/V2
LF-CLOCHE/ ANTICLOCHE
GATE
Switching Interface
MAIN SIGNAL PATH RECORD+PLAYBACK
MAIN SIGNAL PATH RECORD
MAIN SIGNAL PATH PLAYBACK
B_ANA
B_960720

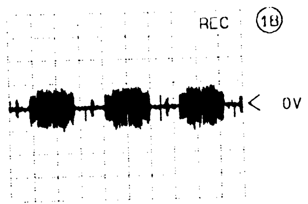


V/Div. 20us/Div
25

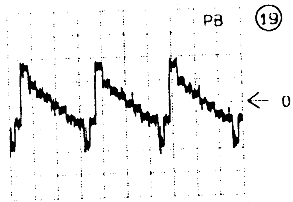


A: AC. 100mV/Div. 20us/Div
IC 7051 Pin 4

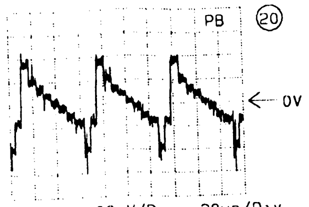
Oscillograms Block Diagram



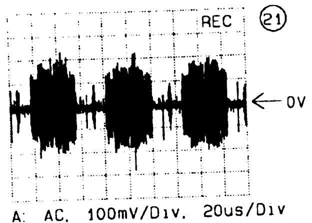
A: AC. 200mV/Div. 20us/Div
IC 7051 Pin 24



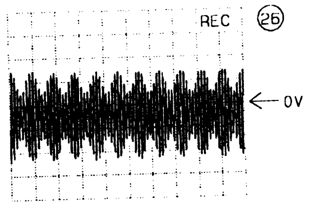
A: AC. 100mV/Div. 20us/Div
IC 7051 Pin 18



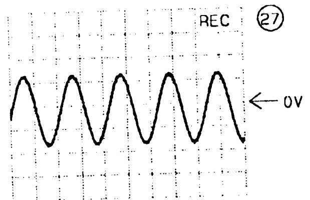
A: AC. 100mV/Div. 20us/Div
IC 7051 Pin 20



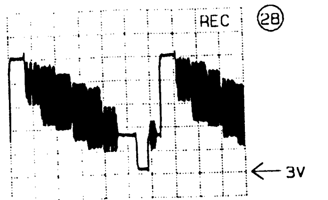
A: AC. 100mV/Div. 20us/Div
IC 7051 Pin 38



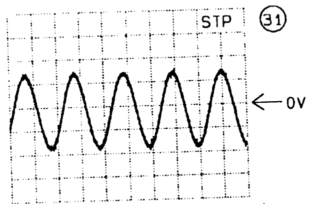
A: DC. 200mV/Div. 200ns/Div
Tuner 1701 Pin 17



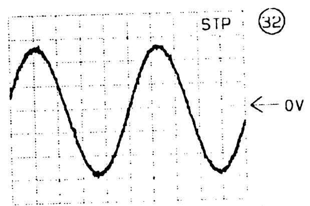
A: AC. 500mV/Div. 500us/Div
Capacitor 2751



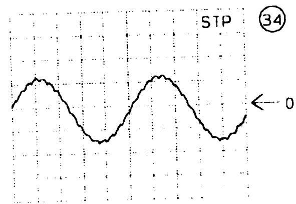
A: DC. 200mV/Div. 10us/Div
Transistor 7725 Emitter



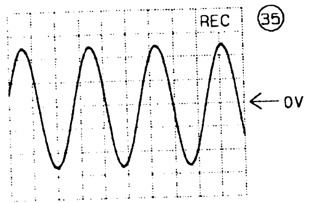
A: AC. 500mV/Div. 500us/Div
Resistor 3605



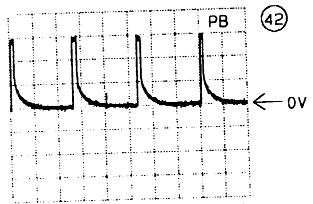
A: AC. 200mV/Div. 200us/Div
Resistor 3611



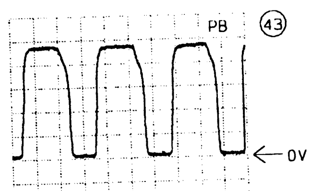
A: AC. 1 V/Div. 200us/Div
Resistor 3650



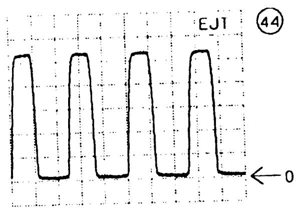
A: AC. 10 V/Div. 5us/Div
Connctor 1962 Pin 2



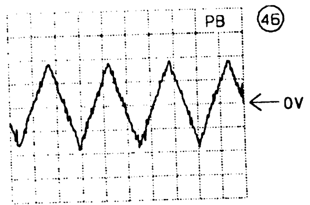
A: DC. 500mV/Div. 5ms/Div
Transistor 7463 Emitter



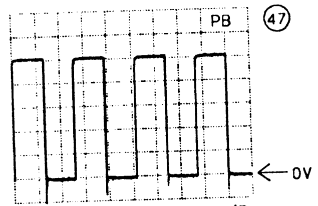
A: DC. 1 V/Div. 200ms/Div
IC 7460 Pin 6



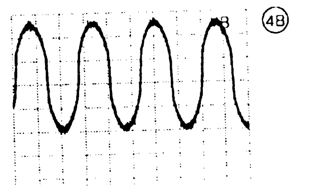
A: DC. 1 V/Div. 10ms/Div
Resistor 3474



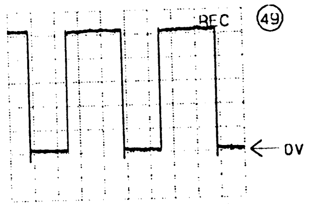
A: AC. 100mV/Div. 10us/Div
Connector 1946 Pin 6



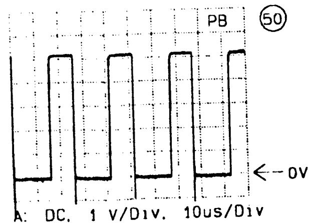
A: DC. 1 V/Div. 10us/Div
Resistor 3482/3481



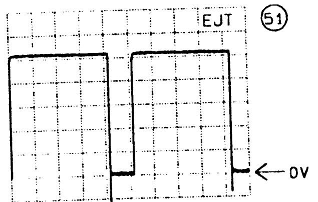
A: DC. 500mV/Div. 500us/Div
Connector 1946 Pin 4



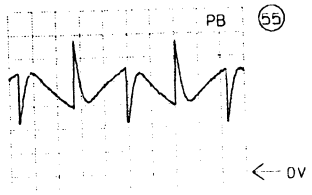
A: DC. 1 V/Div. 10ms/Div
IC 7460 Pin 2



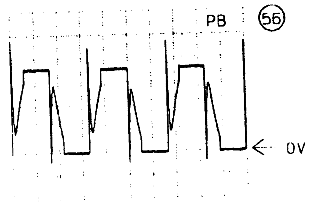
A: DC. 1 V/Div. 10us/Div
Resistor 3312



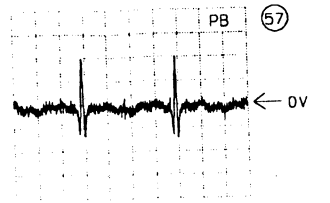
A: DC. 1 V/Div. 10us/Div
IC 7400 Pin 10



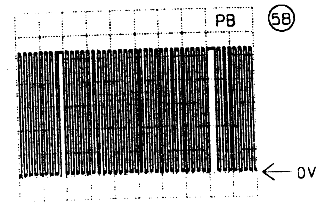
A: DC. 1 V/Div. 500us/Div
Connector 1930 Pin 4



A: DC. 2 V/Div. 2ms/Div
Conector 1930 Pin 1-3

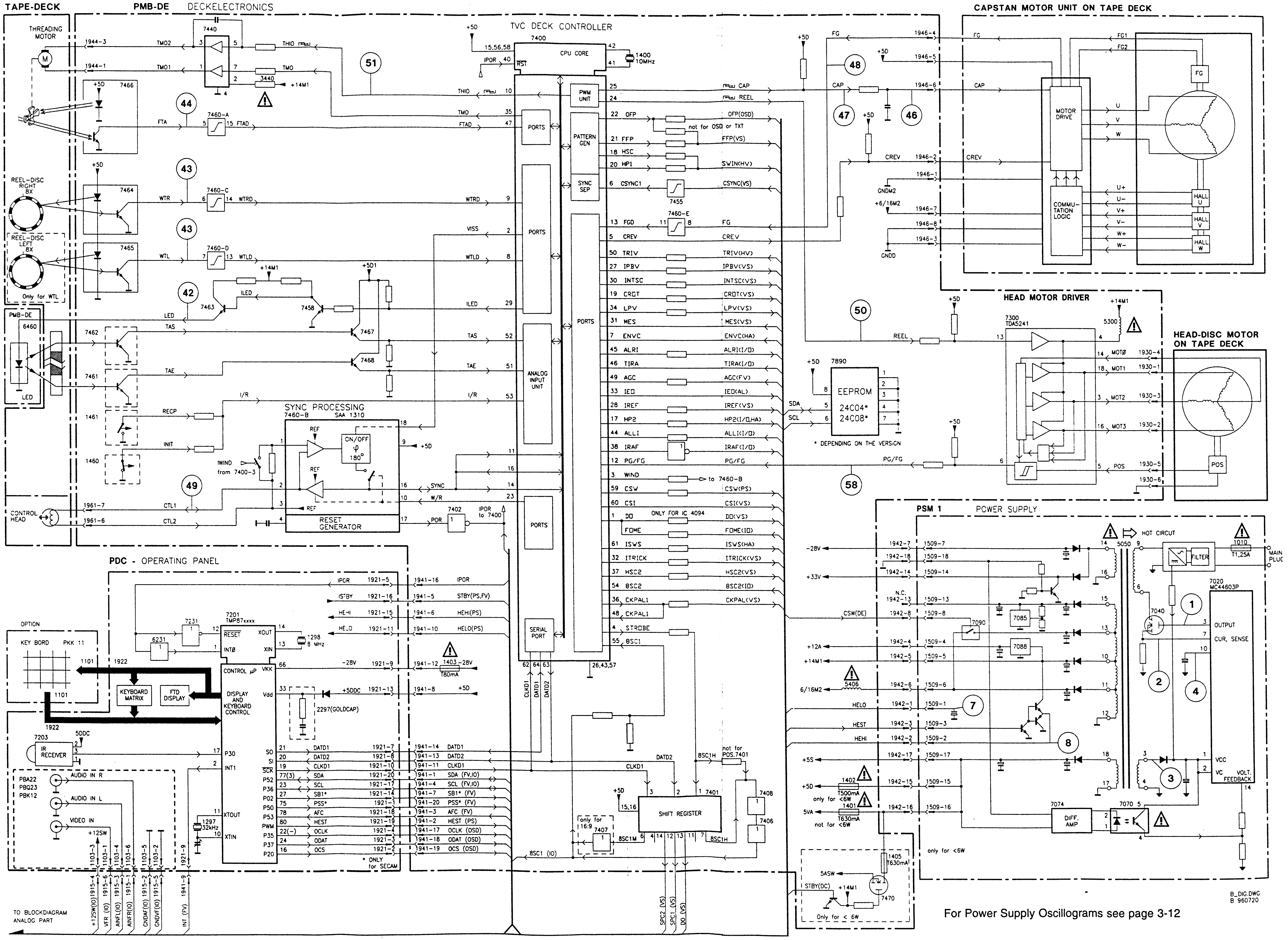


A: AC. 100mV/Div. 10ms/Div
Connector 1930 Pin 5



A: DC. 1 V/Div. 10ms/Div
Resistor 3304

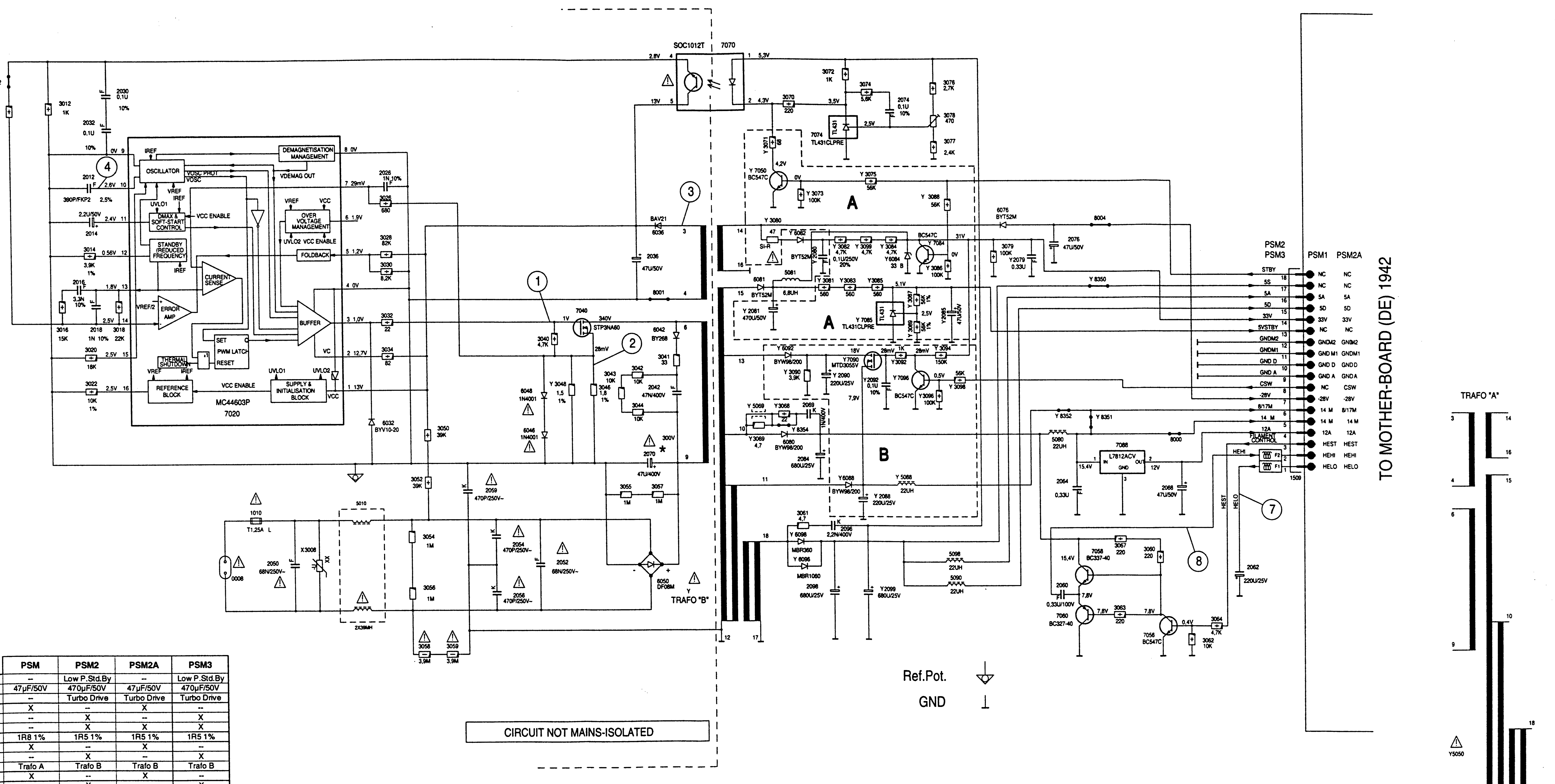
Block Diagram Digital Part Paolina Basic HIFI


TAPE-DECK
PMB-DE DECKELECTRONICS
THREADING MOTOR
REEL-DISC RIGHT 8X
REEL-DISC LEFT 8X
Only for WTL
PMB-DE 6460
LED
CONTROL HEAD
TVC DECK CONTROLLER
7400
CPU CORE
1400 10MHz
PWM UNIT
PORTS
PATTERN GEN
SYNC SEP
ANALOG INPUT UNIT
SERIAL PORT
SYNC PROCESSING 7460-B SAA 1310
CN/OFF φ 180°
RESET GENERATOR
7402
POR
IPOR to 7400
TMO2
TMO1
THIO
TMO
FTA
FTAD
WTR
WTRD
WTL
WTLD
VISS
ILED
LED
TAS
TAE
I/R
RECP
INIT
CTL1
CTL2
WIND from 7400-3
SYNC
W/R
not for OSD or TXT
ONLY FOR IC 4094
22 OFP
21 FFP
18 HSC
20 HP1
6 CSYNC1
13 FGD
5 CREV
50 TRIV
27 IPBV
30 INTSC
19 CRGT
34 LPV
31 MES
7 ENVC
45 ALRI
46 TIRA
49 AGC
33 IEO
28 IREF
17 HP2
44 ALLI
38 IRAF
12 PG/FG
3 WIND
59 CSW
60 CSI
1 DO
FOME
61 ISWS
32 ITRICK
37 HSC2
54 8SC2
36 CKPAL1
48 CKPAL1
4 STROBE
55 8SC1
CAP
REEL
FG
CREV
CAPSTAN MOTOR UNIT ON TAPE DECK
MOTOR DRIVE
COMMU-TATION LOGIC
HALL U
HALL V
HALL W
HEAD MOTOR DRIVER
7300 TDA5241
HEAD-DISC MOTOR ON TAPE DECK
POS
7890
EEPROM
24C04*
24C08*
* DEPENDING ON THE VERSION
SDA
SCL
PSM 1 POWER SUPPLY
HOT CIRCUIT
FILTER
1010 T1,25A
MAIN PLUG
7020 MC44603P
OUTPUT
CUR. SENSE
VCC
VC VOLT. FEEDBACK
DIFF. AMP
7074
7070
only for <6W
not for <6W
Only for < 6W
1402 T500mA
1401 T630mA
1405 T630mA
7470
5ASW
STBY(DC)
-28V
+33V
+12A
+14M1
6/16M2
HELO
HEST
HEHI
+5S
+5D
5VA
CSW(DE)
SHIFT REGISTER
7401
7406
7408
Only for 16:9 7407
not for POS.7401
SPC2 (VS)
SPC1 (VS)
DO (VS)
CLKD1
DATD2
8SC1H
8SC1M
8SC1 (IO)
PDC - OPERATING PANEL
7201 TMP87xxxx
RESET
INT0
XOUT
XIN
CONTROL µP
DISPLAY AND KEYBOARD CONTROL
1298 8 MHz
1297 32kHz
2297(GOLDCAP)
7231
6231
OPTION
KEY BORD PKK 11
KEYBOARD MATRIX
FTD DISPLAY
IR RECEIVER
7203
PBA22
PBQ23
PBK12
AUDIO IN R
AUDIO IN L
VIDEO IN
* ONLY for SECAM
IPOR
STBY(PS,FV)
HEHI(PS)
HELO(PS)
DATD1
DATD2
CLKD1
SDA (FV,IO)
SCL (FV,IO)
SB1* (FV)
PSS* (FV)
AFC (FV)
HEST (PS)
OCLK (OSD)
ODAT (OSD)
OCS (OSD)
+12SW(IO)
VFR (IO)
AINFL(IO)
AINFR(IO)
GNDAF(IO)
GNDVF(IO)
INT (FV)
TO BLOCKDIAGRAM ANALOG PART

For Power Supply Oscillograms see page 3-12

B_DIG.DWG
B 960720

Power Supply PSM (PS)


SOC1012T
7070
MC44603P
7020
OSCILLATOR
DEMAGNETISATION MANAGEMENT
VDEMAG OUT
OVER VOLTAGE MANAGEMENT
UVLO2 VCC ENABLE
DMAX & SOFT-START CONTROL
VCC ENABLE
STANDBY (REDUCED FREQUENCY)
FOLDBACK
CURRENT SENSE
ERROR AMP
BUFFER
SET
PWM LATCH
RESET
THERMAL SHUTDOWN
REFERENCE BLOCK
SUPPLY & INITIALISATION BLOCK
7040
STP3NA60
BAV21
6036
BYT52M
TL431CLPRE
BC547C
BC337-40
BC327-40
L7812ACV
MTD3055V
BYW98/200
MBR360
MBR1060
BYV10-20
1N4001
DF08M
1010
T1,25A L
5010
2X39MH
TRAFO "B"
A
B
1
2
3
4
7
8
PSM2
PSM3
PSM1
PSM2A
STBY
5S
5A
5D
33V
5VSTBY
GNDM2
GNDM1
GND D
GND A
CSW
-28V
8/17M
14 M
12A
FILAMENT CONTROL
HEHI
HELO
HEST
TRAFO "A"
Y5050
CIRCUIT NOT MAINS-ISOLATED
Ref.Pot.
GND
TO MOTHER-BOARD (DE) 1942

	PSM	PSM2	PSM2A	PSM3
A	--	Low P.Std.By	--	Low P.Std.By
2081	47µF/50V	470µF/50V	47µF/50V	470µF/50V
B	--	Turbo Drive	Turbo Drive	Turbo Drive
2079	X	--	X	--
2080	--	X	--	X
2099	--	X	X	X
3048	1R8 1%	1R5 1%	1R5 1%	1R5 1%
3068	X	--	X	--
3069	--	X	--	X
5050	Trafo A	Trafo B	Trafo B	Trafo B
5069	X	--	X	--
6082	--	X	--	X
6084	--	X	--	X
6096	--	--	--	X
6098	X	X	X	--
8350	--	X	X	X
8351	X	--	--	--
8352	--	X	X	X
5081	X	--	X	--
8354	--	X	--	X

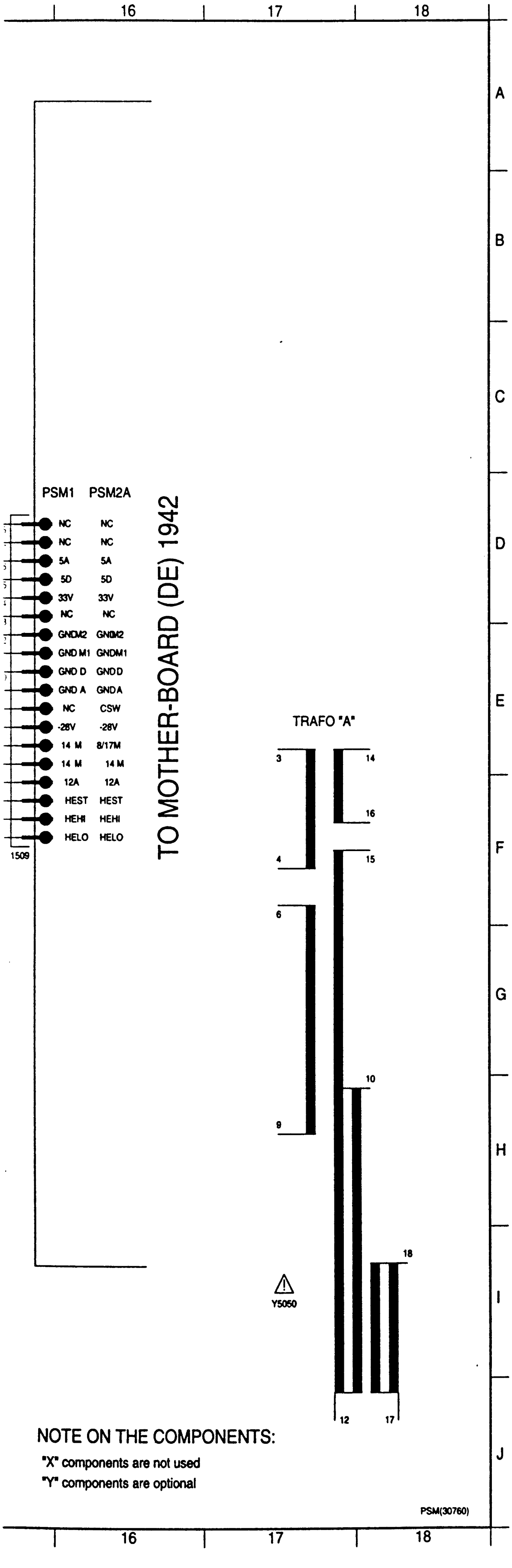
* ...Discharge Pos. 2070 before repairing

Voltages measured in STOP-Mode

NOTE ON THE COMPONENTS:

"X" components are not used

"Y" components are optional

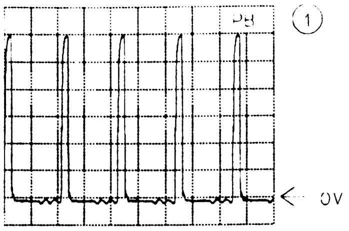

16
17
18
A
B
C
D
E
F
G
H
I
J
PSM1 PSM2A
NC NC
NC NC
5A 5A
5D 5D
33V 33V
NC NC
GNDM2 GNDM2
GND M1 GNDM1
GND D GNDD
GND A GNDA
NC CSW
-28V -28V
14 M 8/17M
14 M 14 M
12A 12A
HEST HEST
HEHI HEHI
HELO HELO
1509
TO MOTHER-BOARD (DE) 1942
TRAFO "A"
3
4
6
9
14
16
15
10
18
12
17
Y5050
PSM(30760)

NOTE ON THE COMPONENTS:

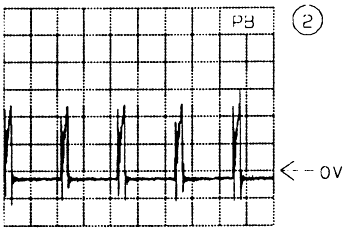
"X" components are not used

"Y" components are optional

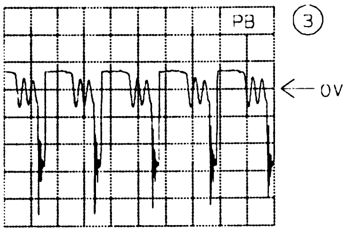
0008	G4
1010	F4
1509	F15
2012	C2
2014	C2
2016	D2
2018	D2
2026	C5
2030	B2
2032	B2
2036	D8
2042	E8
2050	G4
2052	G7
2054	G7
2056	G7
2059	F6
2060	G13
2062	G15
2064	F13
2068	F14
2069	E10
2070	F8
2074	B11
2076	C13
2079	D12
2080	D10
2081	D9
2084	F10
2085	D11
2088	F11
2090	E10
2092	E11
2096	G10
2098	G10
2099	G11
3008	G4
3010	B1
3012	B2
3014	D2
3016	D2
3018	D2
3020	E2
3022	E2
3026	C5
3028	C5
3030	D5
3032	D5
3034	E5
3040	E7
3041	E8
3042	E8
3043	E8
3044	E8
3046	E8
3048	E7
3050	E6
3052	F6
3054	G6
3055	F8
3056	G6
3057	F8
3058	H6
3059	H6
3060	G14
3061	G10
3062	H14
3063	G13
3064	H14
3067	G13
3068	E10
3069	F9
3070	B10
3071	B9
3072	B10
3073	C10
3074	B11
3075	C11
3076	B11
3077	B11
3078	B11
3079	D12
3080	C10
3081	D10
3082	D10
3083	D10
3084	D11
3085	D11
3086	D11
3087	D11
3088	C11
3089	D11
3090	E10
3092	E11
3094	E11
3096	E11
3098	E12
3099	D11
5010	F5
5050	G9
5069	E9
5080	F13
5081	D10
5088	F11
5090	G12
5098	G12
6032	E5
6036	C8
6042	D8
6046	F7
6048	E7
6050	G8
6076	C12
6080	F10
6081	D9
6082	C10
6084	D11
6088	F10
6092	E10
6096	G10
6098	G10
7020	E4
7040	D7
7050	C9
7056	H14
7058	G13
7060	H13
7070	A9
7074	B10
7084	D11
7085	D11
7088	F13
7090	E10
7096	E11



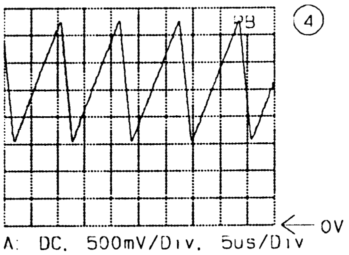
A: DC, 200mV/Div, 5us/Div
Transistor 7040 Gate



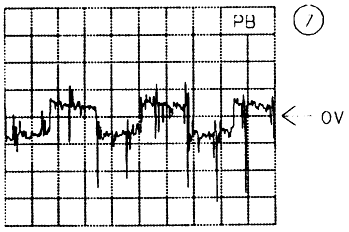
A: DC, 200mV/Div, 5us/Div
Transistor 7040 Source



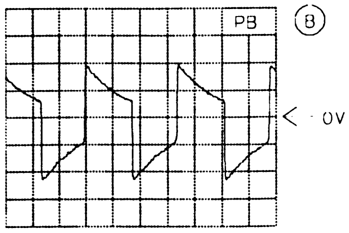
A: DC, 10 V/Div, 5us/Div
Diode 6036 Anode



A: DC, 500mV/Div, 5us/Div
IC 7020 Pin 10



A: AC, 5 V/Div, 10us/Div
Connector 1509 Pin 1



A: AC, 5 V/Div, 10us/Div
Connector 1509 Pin 2

Power Supply PSM (PS)

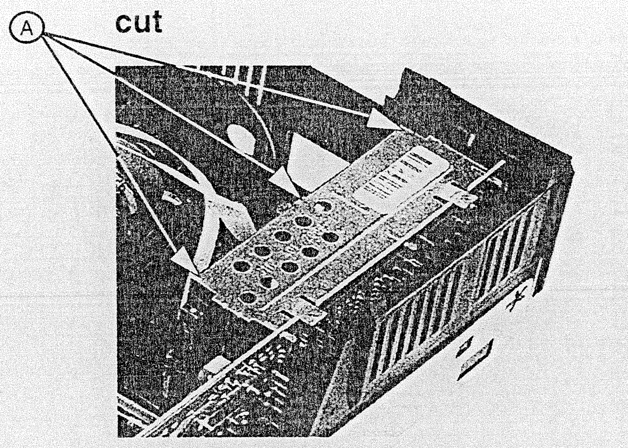


Fig.1

(GB) How to remove the power supply shield

Cut the three slicing plates **A**, see Fig. 1.

(D) Wie entferne ich die Abdeckung des Power Supply

Die 3 Stege **A** (mittels Seitenschneider) durchtrennen, siehe Fig. 1.

(NL) Verwijderen afscherming voedingseenheid

Knip de drie lipjes **A** (m.b.v. zijkniptang) door, zie fig. 1.

(F) Comment retirer le blindage de l'alimentation

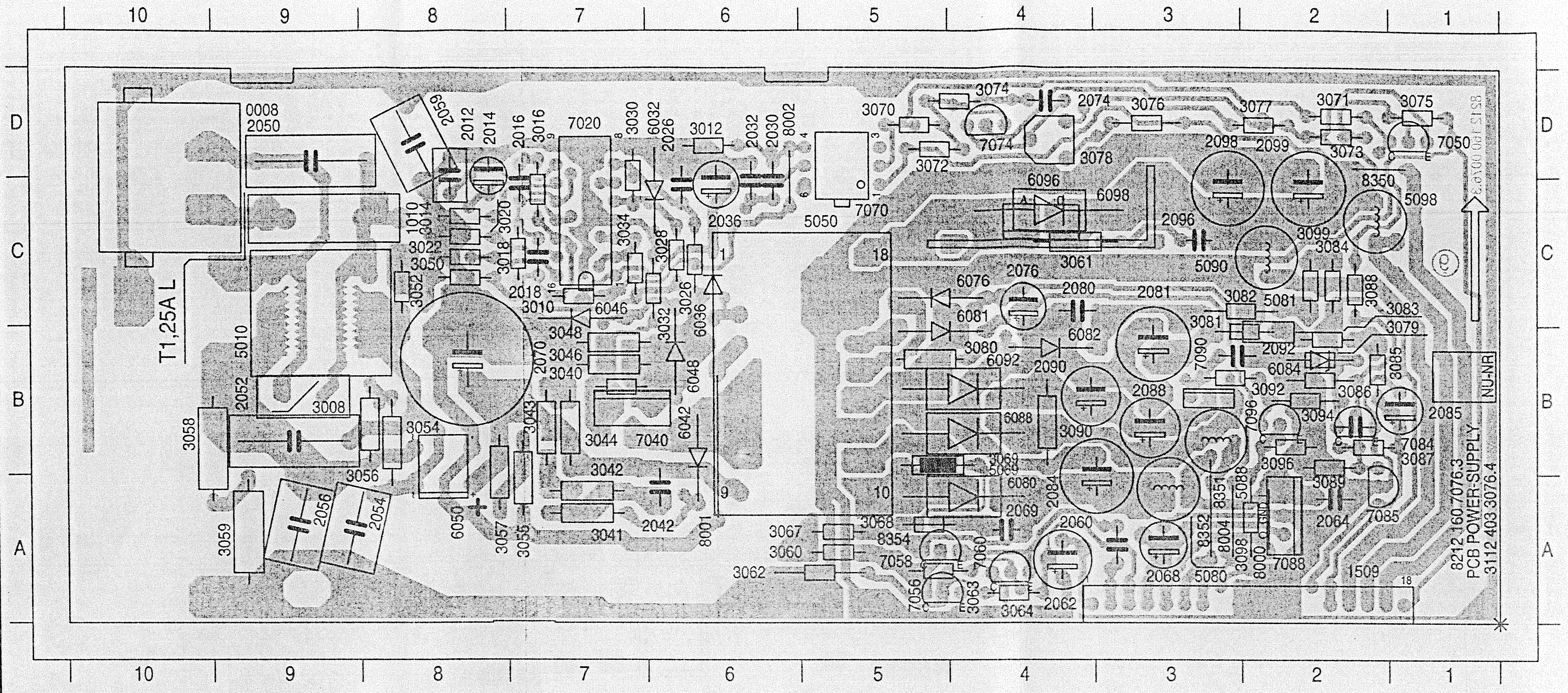
Coupez les trois ergots métalliques **A**, voir Fig. 1.

(I) Come rimuovere la schermatura dell'alimentatore

Tagliare i tre punti di connesione **A**, vedere fig. 1.

(E) Como retirar el apantallamiento de la fuente de alimentación

Cortar las tres pestañas **A**, ver Fig. 1.



0008 D 10	2032 D 6	2062 A 4	2081 B 3	3008 B 9	3028 C 6	3046 B 7	3059 A 9	3070 D 5	3079 B 2	3088 C 2	5050 B 5	6042 B 6	6088 B 4	7060 A 4	8001 B 6
1010 C 9	2036 C 6	2064 A 2	2084 B 3	3010 C 7	3030 D 6	3048 B 7	3060 A 5	3071 D 2	3080 B 4	3089 B 2	5069 B 4	6046 C 7	6092 B 4	7070 D 5	8002 D 5
1509 A 2	2042 A 6	2068 A 3	2085 B 1	3012 D 6	3032 C 6	3050 C 8	3061 C 3	3072 D 4	3081 B 2	3090 B 4	5080 A 3	6048 B 6	6096 C 4	7074 D 4	8004 A 2
2012 D 8	2050 D 9	2069 A 4	2088 B 3	3014 C 8	3034 C 6	3052 C 8	3062 A 5	3073 D 2	3082 C 2	3092 B 2	5081 B 2	6050 B 8	6098 C 4	7084 B 1	8350 D 1
2014 D 7	2052 B 9	2070 B 8	2090 B 3	3016 C 7	3040 B 7	3054 B 8	3063 A 4	3074 D 4	3083 B 2	3094 B 2	5088 B 2	6076 C 4	7020 C 7	7085 A 1	8351 A 2
2016 C 7	2054 A 8	2074 D 4	2092 B 2	3018 C 7	3041 A 7	3055 B 7	3064 A 4	3075 D 1	3084 C 2	3096 B 2	5090 C 2	6080 A 4	7040 B 6	7088 A 2	8352 A 2
2018 C 7	2056 A 9	2076 C 4	2096 C 3	3020 C 8	3042 A 7	3056 B 8	3067 A 5	3076 D 3	3085 B 1	3098 A 2	5098 C 1	6081 B 4	7050 D 1	7090 B 3	8354 A 4
2026 C 6	2059 D 8	2079 B 2	2098 C 2	3022 C 8	3043 B 7	3057 B 7	3068 A 4	3077 D 2	3086 B 2	3099 C 2	6032 C 6	6082 B 4	7056 A 4	7096 B 2	
2030 D 5	2060 A 3	2080 C 3	2099 C 2	3026 C 6	3044 B 7	3058 B 9	3069 B 4	3078 D 4	3087 B 1	5010 C 9	6036 C 6	6084 B 2	7058 A 4	8000 A 2	

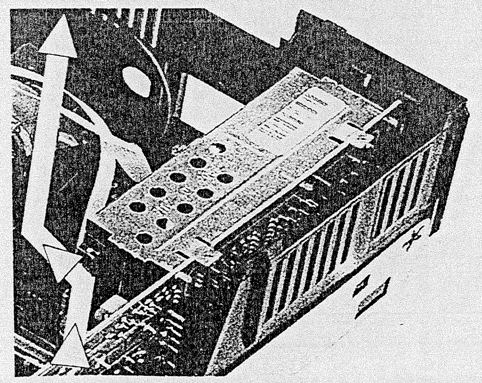


Fig. 2

(GB) Lift-up the shield cover about 3mm, disengage it and pull it out (see Fig. 2).
Note: To mount the shield cover please proceed in the reverse order.

(D) Die Abdeckung an der Oberseite 3 mm anheben und nach innen abziehen, siehe Fig. 2. Die Montage erfolgt in umgekehrter Reihenfolge.

(NL) Til het afschermingsdeksel aan de bovenzijde 3 mm op, draai deze naar binnen, zie fig. 2. Nu kan de afscherming verwijderd worden.
Opm: De montage van de afscherming geschiedt in omgekeerde volgorde.

(F) Soulevez le blindage de 3mm vers le haut, dégagez-le vers la gauche et retirez-le (voir Fig. 2).
Pour remettre en place le blindage, procédez dans l'ordrte inverse.

(I) Sollevare il coperchio dalla parte superiore di circa 3 mm e ruotarlo per toglierlo, vedere fig. 2.
Ora la schermatura può essere tolta.
Nota: Per rimontare la schermatura, procedere in ordine inverso.

(E) Levantar la tapa de pantalla 3 mm, girarla y tirar de ella hacia arriba, ver Fig. 2.
Ahora el apantallamiento puede ser retirado.
Nota: Para montar el apantallamiento proceder en el orden inverso.

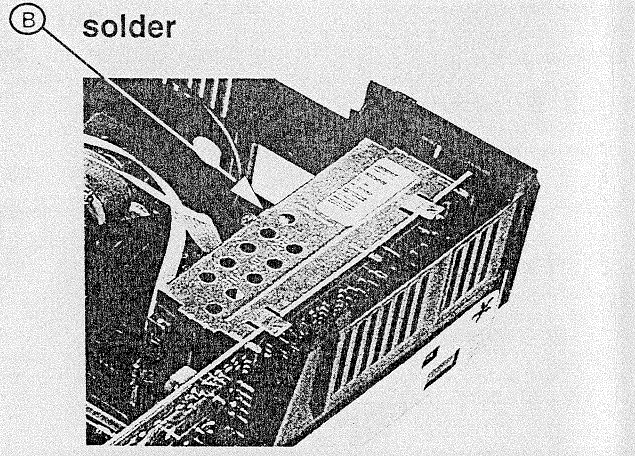


Fig.3

(GB) Important:

After mounting the shield plate it is indispensable that the splicing plate B is resoldered for safety reasons, see Fig. 3.

(D) Achtung:

Nach Montage des Deckels muß der Steg B unbedingt aus Sicherheitsgründen mit dem Gehäuse verlötet werden, siehe Fig. 3.

(NL) Belangrijk:

Na montage van de afschermplaat is het noodzakelijk dat het lipje B om veiligheidsredenen weer aan het huis gesoldeerd wordt, zie fig. 3.

(F) Important:

Une fois le blindage remis en place, il est indispensable de resouder l'ergot B pour des raisons de sécurité. voir Fig. 3.

(I) Importante:

Dopo aver montato la schermatura è indispensabile per ragioni di sicurezza saldare accuratamente la piastra B, vedere fig. 3.

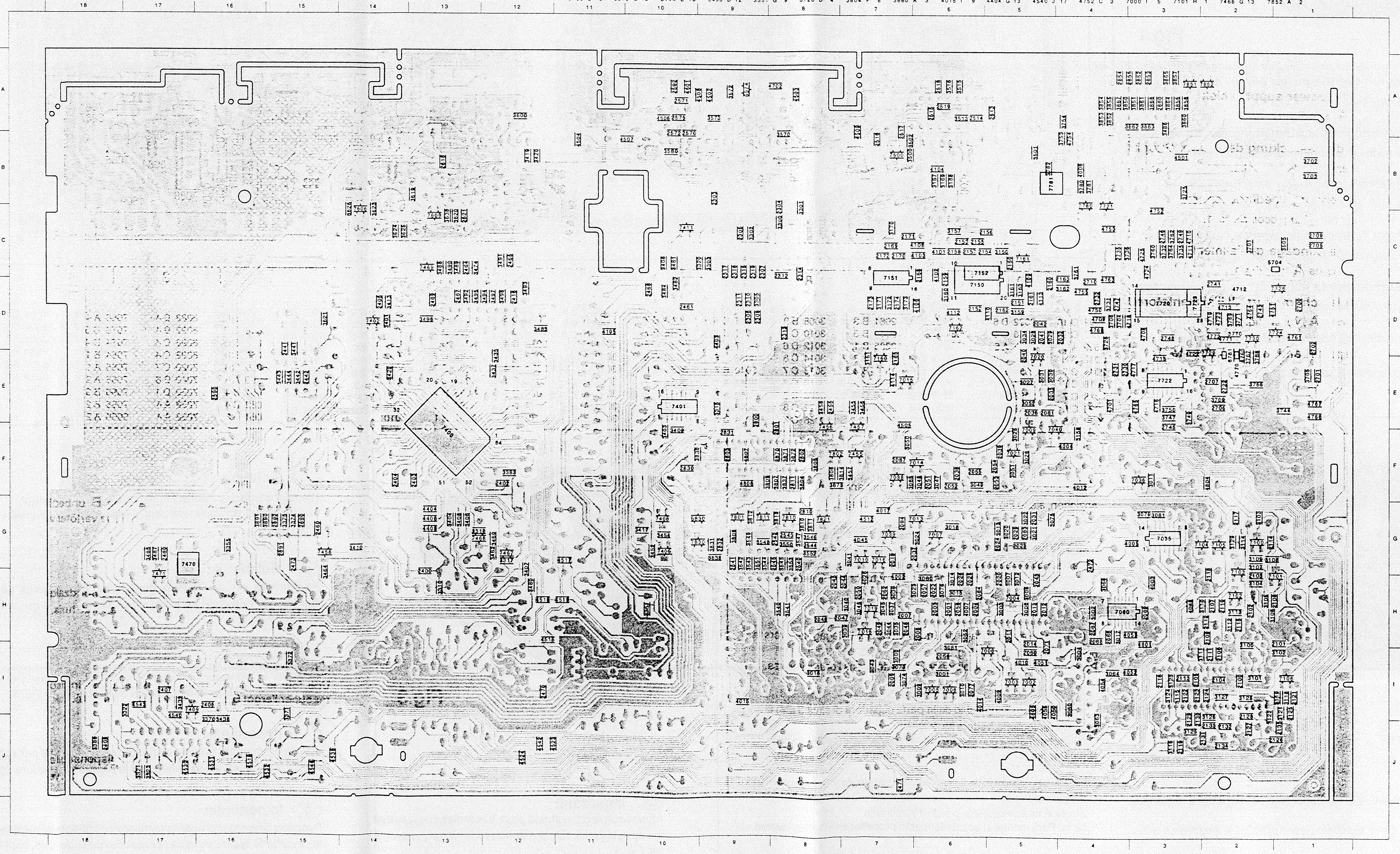
(E) Importante:

Despues de montar el apantallamiento es indispensable que la pestaña B quede soldada por razones de seguridad, ver Fig. 3.

Mother Board PMB - MOBO solder side

2001 H 6	2039 F 5	2068 H 4	2115 H 2	2154 C 5	2310 D 9	2465 C 12	2572 A 10	2748 D 3	3006 H 5	3031 E 5	3073 I 7	3116 J 3	3170 C 7
2003 H 6	2040 E 5	2069 H 3	2116 I 3	2155 C 6	2311 D 9	2467 D 13	2575 A 10	2749 C 3	3007 H 5	3034 D 5	3074 I 7	3118 I 1	3171 D 7
2004 H 6	2041 D 5	2071 I 5	2117 G 2	2156 C 5	2312 C 8	2468 D 10	2590 E 16	2800 E 9	3008 H 5	3035 H 7	3075 G 5	3119 I 1	3172 D 7
2006 H 6	2042 D 5	2077 I 6	2118 H 2	2157 C 6	2313 D 8	2469 D 13	2592 A 10	2801 F 8	3009 I 6	3036 H 7	3076 H 6	3121 I 1	3173 D 7
2007 H 7	2043 H 5	2081 E 5	2119 J 3	2158 C 6	2314 C 8	2470 I 12	2618 B 13	2802 F 8	3010 I 6	3037 H 7	3079 G 3	3122 I 2	3300 C 8
2009 I 7	2044 H 7	2083 G 5	2121 I 1	2159 C 6	2315 C 9	2471 J 7	2621 C 13	2803 F 9	3011 F 3	3039 H 7	3080 H 6	3123 I 3	3301 C 8
2011 H 5	2045 H 8	2084 H 6	2122 I 3	2160 D 5	2316 C 9	2472 G 4	2700 D 1	2810 G 8	3012 H 5	3040 H 7	3081 G 3	3124 I 3	3302 C 9
2012 H 5	2046 H 8	2087 F 7	2123 I 3	2161 D 5	2317 C 9	2473 G 15	2701 E 1	2811 F 8	3013 G 5	3041 G 7	3085 F 7	3125 J 3	3303 C 9
2013 H 5	2047 H 7	2094 G 7	2124 I 2	2162 D 5	2319 C 9	2480 G 17	2702 D 1	2830 F 10	3014 H 6	3043 I 7	3100 H 2	3126 I 2	3305 D 9
2014 H 5	2048 H 7	2100 I 2	2125 I 1	2163 C 4	2400 H 13	2513 A 5	2705 C 1	2831 F 9	3015 H 6	3044 H 7	3101 I 2	3127 I 2	3310 H 13
2019 G 7	2049 H 7	2101 H 1	2126 J 1	2165 E 7	2402 F 12	2514 A 6	2706 E 2	2832 G 9	3016 I 8	3045 H 7	3102 I 1	3128 I 2	3315 E 9
2020 H 5	2050 H 7	2102 H 2	2127 J 2	2168 C 6	2403 F 13	2515 A 6	2707 E 2	2852 A 3	3017 H 4	3046 H 7	3103 G 2	3129 G 2	3317 G 12
2022 H 6	2051 F 6	2103 H 2	2128 I 2	2169 C 7	2404 F 14	2516 B 7	2709 C 1	2853 A 3	3018 G 6	3047 F 6	3104 H 2	3150 C 5	3318 G 13
2023 G 5	2052 F 6	2104 I 2	2129 I 3	2170 C 7	2405 D 14	2517 A 7	2710 D 4	2854 A 4	3020 G 5	3048 F 6	3105 H 2	3151 E 7	3320 C 9
2024 G 5	2053 F 5	2105 I 3	2130 I 3	2171 C 7	2406 I 16	2518 A 6	2722 E 2	2855 A 3	3021 G 5	3049 F 6	3106 H 2	3157 C 6	3321 J 17
2025 H 6	2054 F 5	2106 H 1	2131 J 2	2172 C 7	2407 I 17	2519 A 6	2730 E 4	2860 A 3	3022 G 5	3050 F 7	3107 G 2	3158 F 4	3322 I 17
2026 H 6	2055 F 6	2107 H 2	2132 J 2	2173 D 7	2408 J 18	2540 G 8	2731 E 4	2890 G 15	3023 H 6	3051 F 5	3108 G 2	3159 D 5	3323 J 17
2029 G 5	2056 I 6	2108 I 2	2133 J 2	2174 D 7	2416 D 12	2541 G 9	2732 D 4	2891 G 15	3024 G 6	3052 E 5	3109 G 2	3160 D 6	3351 H 10
2031 G 5	2057 H 6	2109 H 2	2134 J 2	2303 B 9	2441 D 15	2542 G 8	2735 C 4	2892 G 15	3025 F 5	3060 I 4	3110 H 2	3161 D 5	3355 G 16
2032 D 4	2058 H 6	2110 H 2	2135 J 1	2304 B 8	2442 E 15	2543 G 8	2741 D 2	3000 I 7	3026 F 5	3061 I 6	3111 I 2	3162 D 4	3370 J 16
2035 E 5	2060 I 5	2111 I 2	2150 C 5	2305 C 9	2455 E 8	2544 G 8	2743 D 2	3001 I 6	3027 E 5	3062 H 6	3112 H 2	3163 D 5	3371 I 15
2036 E 5	2062 H 7	2112 H 2	2151 D 5	2306 D 9	2460 G 15	2545 G 8	2745 E 3	3002 H 4	3028 D 5	3063 J 4	3113 H 2	3167 B 6	3372 I 15
2037 G 6	2066 H 4	2113 I 3	2152 D 6	2307 C 9	2461 D 10	2570 A 10	2746 C 3	3003 H 5	3029 D 5	3064 I 4	3114 G 2	3168 B 6	3374 G 15
2038 F 6	2067 H 4	2114 G 2	2153 C 6	2308 D 9	2464 C 13	2571 A 10	2747 D 4	3004 I 4	3030 E 5	3068 H 4	3115 I 3	3169 B 6	3375 G 15

3383 F 12	3452 G 10	3494 D 12	3552 G 8	3731 D 4	3805 F 8	3861 A 3	4017 G 7	4406 G 13	4542 J 12	4753 C 4	7002 I 5	7102 H 2	7469 C 13
3388 J 18	3454 G 10	3495 D 13	3553 G 8	3732 C 3	3806 F 8	3862 A 3	4026 H 7	4408 G 13	4543 I 17	4754 B 4	7003 I 5	7103 G 2	7470 G 17
3401 D 14	3455 E 7	3496 D 13	3570 A 8	3735 C 3	3807 F 8	3863 A 3	4045 G 7	4501 B 3	4546 J 15	4755 D 4	7004 H 5	7104 G 2	7471 H 17
3403 F 10	3456 E 7	3497 D 12	3572 A 9	3736 C 4	3808 G 9	3864 A 3	4048 H 3	4502 A 9	4601 A 10	4760 D 4	7005 I 6	7105 G 2	7500 B 7
3404 G 13	3457 F 7	3498 D 12	3573 A 9	3744 E 1	3809 F 9	3865 A 3	4050 I 5	4503 A 8	4701 E 4	4761 D 1	7007 G 6	7106 I 1	7606 C 14
3405 G 13	3458 E 8	3500 B 7	3580 B 10	3747 E 3	3810 G 8	3866 A 3	4051 I 5	4504 B 11	4702 A 8	4763 C 4	7008 I 6	7150 C 6	7609 C 13
3406 G 13	3460 G 12	3501 B 5	3600 A 12	3749 E 3	3811 G 8	3867 A 4	4052 I 3	4505 E 7	4708 D 3	4764 D 2	7009 F 5	7151 C 7	7720 D 3
3407 G 12	3462 G 12	3502 B 7	3619 B 13	3750 E 3	3812 G 9	3870 F 8	4053 H 3	4506 A 10	4709 D 4	4765 E 3	7010 G 7	7152 C 6	7721 B 4
3408 C 10	3464 H 15	3505 C 1	3620 C 13	3753 B 4	3813 G 8	3871 F 8	4054 I 4	4507 B 10	4710 C 3	4766 E 1	7013 G 6	7160 E 7	7722 E 3
3409 F 10	3474 C 13	3513 A 6	3621 D 15	3754 A 4	3814 F 7	3872 F 8	4055 I 5	4508 A 9	4711 C 3	4767 E 1	7014 F 6	7161 C 5	7723 D 3
3410 G 14	3480 H 12	3515 A 6	3623 C 14	3760 C 3	3830 F 10	3873 F 8	4101 C 6	4509 A 7	4712 D 2	4770 E 2	7015 E 7	7162 D 6	7724 D 1
3413 D 14	3481 C 10	3516 A 6	3624 C 14	3761 C 4	3831 G 9	3890 G 16	4102 C 6	4512 G 7	4713 D 2	4771 D 2	7016 G 7	7400 F 13	7726 D 1
3417 G 10	3482 D 10	3540 H 8	3625 C 14	3762 C 3	3837 F 8	3891 G 16	4103 C 6	4515 H 12	4715 E 3	4772 D 2	7018 H 7	7401 E 10	7729 D 2
3419 B 12	3483 D 12	3541 H 8	3626 C 14	3764 C 3	3838 G 9	4002 H 7	4104 B 6	4516 H 12	4716 E 3	4801 H 3	7019 H 7	7402 D 14	7730 D 2
3420 B 12	3484 D 10	3542 G 9	3638 C 13	3766 E 2	3850 A 4	4003 H 3	4105 D 11	4517 G 11	4717 E 3	4804 F 2	7020 E 5	7406 G 10	7780 B 4
3422 E 14	3485 G 17	3543 G 9	3701 C 2	3767 E 2	3851 A 3	4004 F 4	4106 D 6	4518 J 16	4718 D 4	4805 I 5	7021 F 5	7408 G 10	7781 B 5
3435 E 12	3486 A 3	3544 G 9	3702 B 1	3768 E 2	3852 A 4	4005 G 3	4108 C 6	4519 H 11	4719 D 2	4806 F 9	7035 G 3	7409 I 17	7801 G 9
3437 E 12	3487 G 17	3545 G 8	3703 B 1	3769 D 2	3853 A 4	4006 B 4	4109 C 5	4523 J 12	4722 D 3	4807 F 9	7036 F 3	7411 C 10	7802 F 8
3438 J 16	3488 C 13	3546 G 8	3704 D 4	3770 D 2	3854 A 4	4007 H 6	4110 D 5	4524 J 12	4723 D 2	5704 C 1	7038 F 7	7455 F 7	7810 G 8
3439 I 17	3489 C 13	3547 G 8	3705 E 1	3771 D 2	3855 A 4	4009 I 5	4112 D 6	4530 J 17	4724 C 3	6574 A 9	7039 G 7	7456 F 8	7811 G 9
3441 D 15	3490 C 13	3548 G 9	3706 D 4	3780 B 4	3856 A 3	4010 I 5	4113 D 5	4531 J 16	4725 C 3	6760 E 2	7040 F 5	7457 F 7	7821 G 8
3442 E 15	3491 C 12	3549 G 9	3709 E 2	3781 B 4	3857 A 3	4012 F 4	4114 E 7	4532 J 16	4750 D 4	6761 E 2	7060 H 4	7458 G 15	7830 G 10
3443 E 15	3492 D 13	3550 G 8	3725 B 3	3782 B 5	3858 A 3	4014 I 6	4403 D 9	4538 J 15	4751 D 2	6830 G 10	7100 G 2	7467 G 12	7851 A 3
3444 E 15	3493 D 12	3551 G 9	3726 D 4	3804 F 8	3860 A 3	4015 I 9	4404 G 13	4540 J 17	4752 C 3	7000 I 5	7101 H 1	7468 G 13	7852 A 2



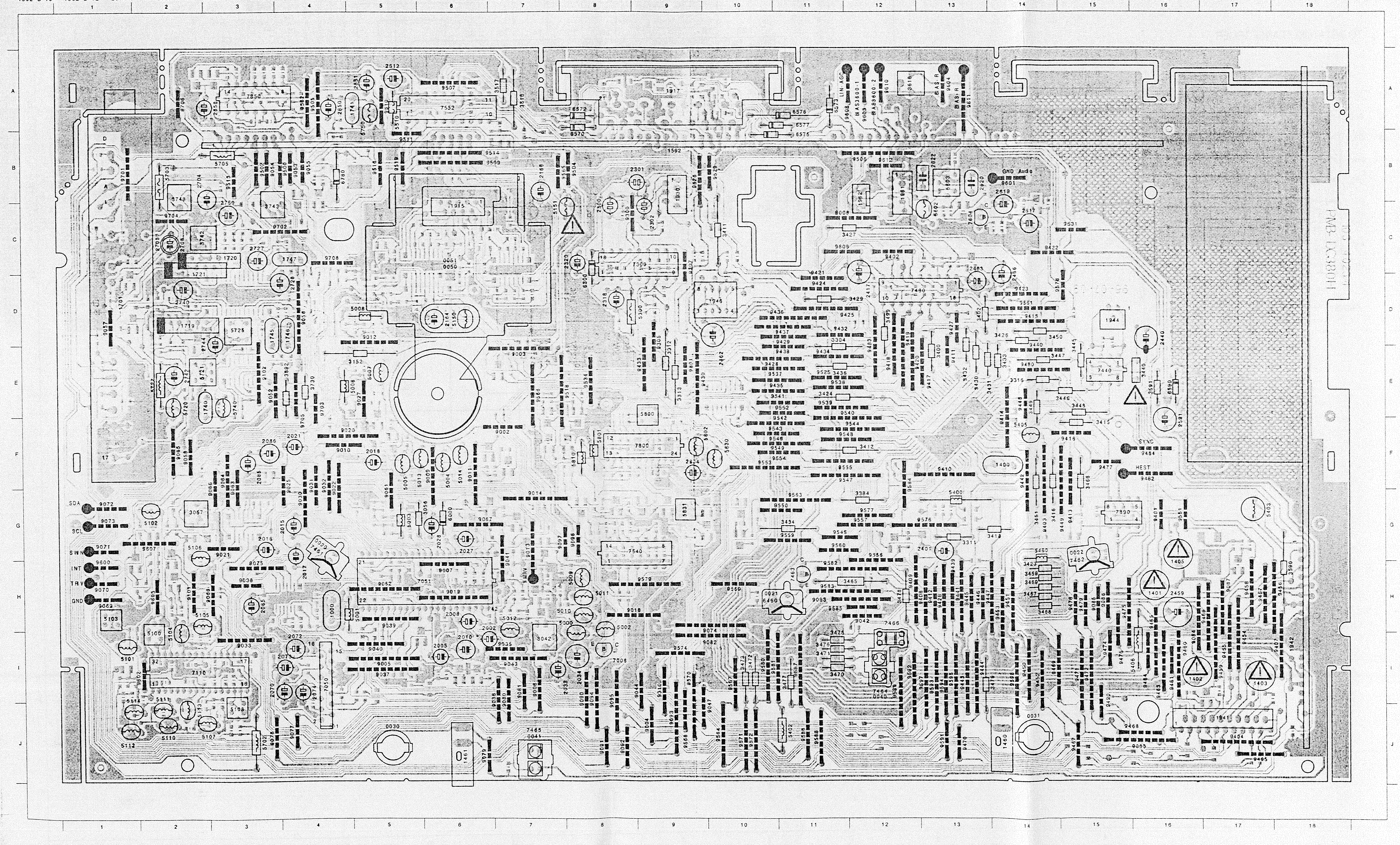
Mother Board PMB - MOBO components side

0020 G 4	1701 D 1	2002 I 6	2085 F 3	2617 C 14	3056 G 5	3426 D 14
0021 H 11	1719 D 2	2005 I 6	2086 F 3	2619 C 14	3057 G 2	3427 C 12
0022 G 15	1720 C 3	2008 H 6	2164 D 6	2620 B 13	3152 E 5	3429 D 11
0030 J 5	1721 C 2	2010 I 6	2166 B 7	2622 B 13	3304 E 11	3430 E 13
0031 J 14	1740 E 2	2015 G 4	2300 C 8	2703 C 2	3311 G 13	3431 E 13
0040 I 12	1741 A 5	2016 G 3	2301 B 9	2704 B 3	3312 E 9	3432 E 13
0041 J 7	1745 D 3	2017 G 4	2302 C 9	2708 C 2	3313 E 9	3433 E 14
0050 E 6	1746 D 4	2018 F 5	2318 D 8	2727 C 3	3316 E 14	3434 G 11
0051 E 6	1747 C 4	2021 F 4	2320 C 8	2728 D 4	3384 G 12	3436 E 11
1000 H 4	1915 C 6	2027 G 6	2401 G 13	2740 D 2	3400 E 13	3440 E 16
1400 F 14	1917 A 9	2028 G 6	2417 C 12	2742 E 2	3402 D 13	3445 E 15
1401 H 16	1930 B 9	2033 I 7	2440 D 16	2744 D 3	3411 C 10	3446 E 15
1402 I 16	1941 J 17	2034 I 8	2459 H 16	2750 C 3	3412 F 12	3447 E 14
1403 I 17	1942 J 18	2065 H 3	2462 D 10	2804 F 9	3415 F 15	3448 E 15
1405 G 16	1944 D 15	2070 I 4	2463 D 13	2850 A 4	3416 F 14	3449 E 14
1460 J 14	1946 D 10	2072 I 4	2466 D 14	2851 A 5	3418 G 14	3450 D 14
1461 J 6	1961 B 12	2073 I 4	2512 A 5	2858 A 3	3423 H 14	3451 F 14
1592 B 10	1962 B 12	2074 I 4	2591 F 16	3042 I 7	3424 E 11	3459 H 14

3465 H 12	3591 E 16	5011 H 8	5150 D 6	5727 E 2	6590 E 18	7800 F 9
3466 F 15	3618 A 12	5012 H 7	5151 C 8	5740 E 3	6780 B 4	7850 A 3
3467 H 14	3730 E 4	5013 F 5	5300 D 8	5750 A 5	7006 I 8	7890 G 15
3468 H 14	3742 C 2	5014 F 6	5400 G 13	5800 E 9	7050 I 4	9002 F 7
3469 H 14	3743 C 3	5100 I 2	5402 J 11	5801 F 8	7051 H 6	9003 E 7
3470 I 11	3748 B 2	5101 I 1	5403 G 17	5802 F 9	7110 I 2	9004 J 9
3471 I 11	3892 E 4	5102 G 2	5405 F 14	5810 F 8	7300 C 9	9005 I 5
3472 I 10	5000 I 8	5103 H 1	5406 I 16	5830 F 10	7440 E 15	9006 I 7
3473 I 10	5001 H 4	5104 I 2	5460 G 14	5831 G 9	7460 D 13	9007 H 6
3475 I 11	5002 H 8	5105 H 2	5510 A 5	6000 G 6	7461 G 4	9008 C 12
3476 I 11	5003 G 5	5106 G 2	5602 C 13	6300 C 8	7462 G 15	9009 F 6
3477 I 11	5004 F 6	5107 J 2	5603 B 13	6460 H 11	7463 H 11	9010 F 4
3478 H 12	5005 F 5	5108 J 3	5702 J 3	6570 A 8	7464 I 12	9011 F 6
3479 I 13	5006 E 4	5110 J 2	5703 B 2	6572 A 8	7465 J 7	9012 D 5
3499 D 12	5007 E 5	5111 J 2	5705 B 3	6573 A 11	7466 H 12	9013 G 7
3517 A 7	5008 D 5	5112 J 1	5720 E 2	6575 B 10	7540 G 9	9014 G 7
3518 A 7	5009 H 8	5113 J 2	5721 E 2	6576 A 11	7552 A 6	9018 H 8
3590 H 18	5010 H 8	5114 J 1	5725 D 3	6577 A 11	7604 C 13	9019 H 6

9020 F 4	9044 I 9	9069 H 1	9090 I 8	9405 J 17	9424 D 11	9443 I 13
9021 G 3	9047 J 9	9070 H 1	9091 J 8	9407 I 18	9425 D 11	9444 I 13
9022 F 4	9052 E 3	9071 G 1	9092 J 8	9408 H 13	9426 H 13	9445 H 13
9025 F 4	9053 B 4	9072 G 1	9093 J 9	9409 H 12	9427 D 13	9446 H 13
9027 E 5	9054 B 3	9073 G 1	9094 I 8	9410 F 13	9428 E 10	9447 H 14
9030 G 4	9055 B 4	9074 H 10	9095 I 8	9411 E 13	9429 D 11	9448 E 14
9031 F 4	9056 D 4	9075 H 3	9096 G 8	9412 H 13	9430 E 9	9449 F 15
9032 F 4	9057 D 1	9077 J 4	9097 G 8	9413 F 15	9432 D 11	9450 I 14
9033 I 3	9058 F 2	9078 J 3	9101 H 2	9414 F 14	9433 E 9	9451 H 14
9035 I 7	9060 J 16	9079 J 6	9102 E 3	9415 D 14	9434 E 11	9452 I 14
9036 I 7	9061 G 5	9080 I 7	9300 C 8	9416 F 15	9435 E 11	9453 H 14
9037 I 5	9062 H 5	9081 I 7	9305 D 9	9417 E 13	9436 D 11	9454 I 17
9038 H 3	9063 F 3	9082 I 10	9307 C 9	9418 D 12	9437 D 11	9455 I 17
9039 H 5	9064 F 3	9083 H 12	9310 I 9	9419 E 12	9438 E 11	9456 H 18
9040 I 5	9065 F 2	9084 H 16	9401 G 16	9420 E 12	9439 H 13	9457 H 17
9041 G 7	9066 F 3	9085 H 15	9402 C 12	9421 D 11	9440 E 14	9458 H 17
9042 H 12	9067 G 6	9086 H 15	9403 F 14	9422 C 14	9441 H 13	9459 I 17
9043 I 7	9068 H 3	9087 H 17	9404 J 17	9423 D 14	9442 F 14	9460 I 16

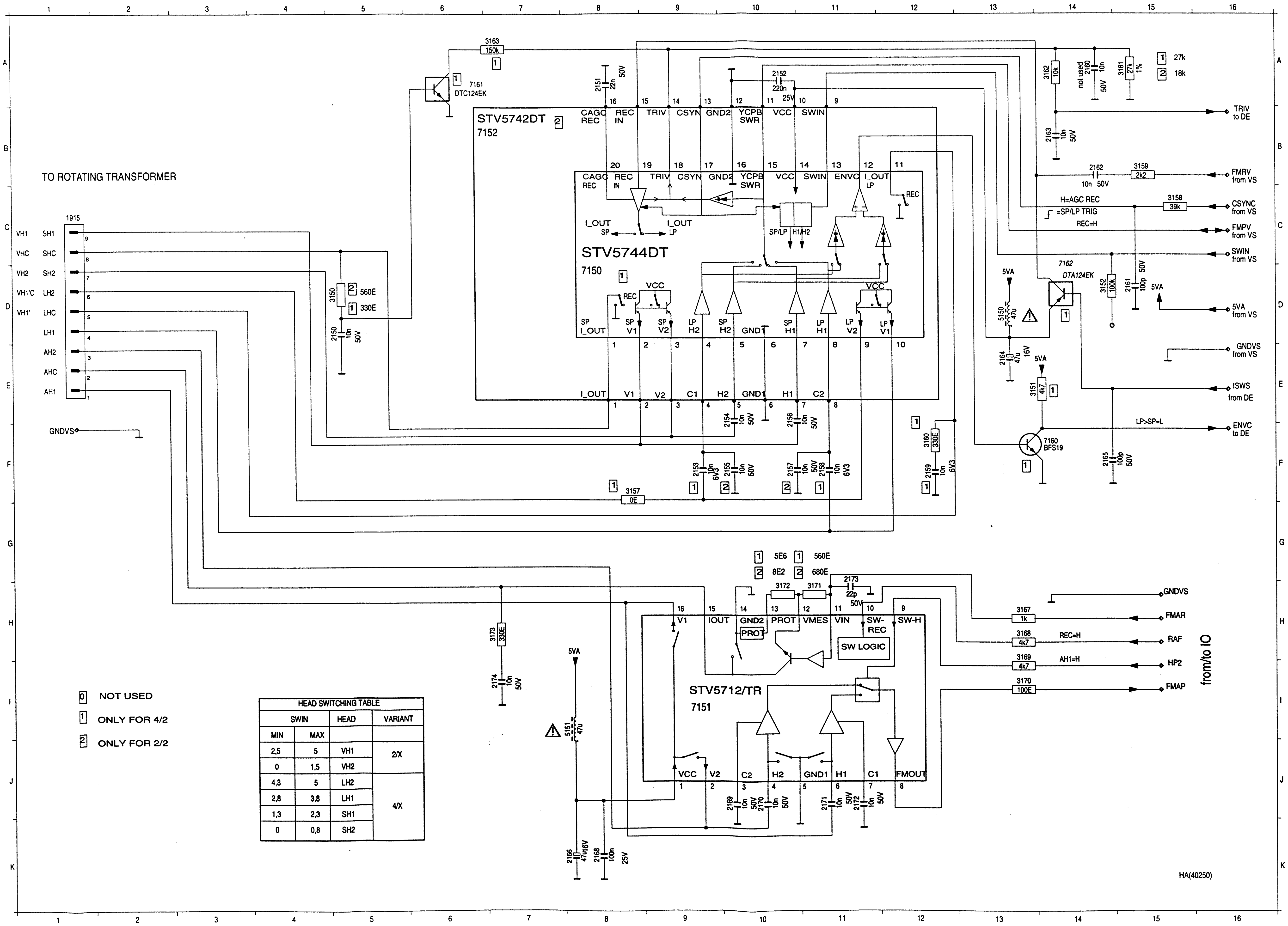
9461 I 16	9482 F 16	9525 E 11	9550 G 11	9569 H 10	9589 I 12	9611 A 13
9463 I 16	9483 E 12	9528 B 9	9551 G 16	9570 J 9	9591 J 13	9612 B 12
9464 I 16	9484 F 16	9529 B 10	9552 E 11	9571 J 10	9592 I 12	9701 B 1
9465 I 16	9490 I 15	9531 C 15	9553 F 10	9572 J 10	9593 I 13	9702 C 4
9466 H 17	9500 B 4	9534 E 8	9554 F 11	9574 I 9	9594 I 13	9703 E 4
9467 J 15	9502 B 3	9537 E 11	9555 F 11	9576 G 13	9595 I 13	9704 C 2
9468 J 16	9504 B 8	9538 E 11	9556 H 12	9577 G 12	9597 I 13	9705 E 4
9469 I 14	9505 A 4	9539 E 11	9557 G 12	9578 D 15	9598 I 14	9706 A 2
9470 J 13	9506 B 12	9540 F 12	9559 G 11	9579 H 9	9600 H 1	9708 C 4
9471 I 15	9507 A 6	9541 E 11	9560 G 11	9580 I 10	9601 B 14	9801 E 9
9472 I 15	9509 B 6	9542 E 11	9561 D 14	9581 I 11	9602 I 2	
9474 I 15	9510 A 5	9543 F 11	9562 A 4	9582 H 12	9603 A 12	
9475 H 15	9511 B 5	9544 F 12	9563 G 11	9583 H 11	9604 A 13	
9476 H 15	9513 B 3	9545 G 11	9564 J 10	9584 F 12	9605 H 2	
9477 F 15	9514 B 6	9546 F 11	9565 B 7	9585 H 12	9606 C 11	
9478 H 15	9516 B 5	9547 F 11	9566 E 7	9586 J 11	9607 G 2	
9479 H 15	9518 E 7	9548 F 11	9567 I 10	9587 I 11	9608 A 12	
9480 E 14	9519 B 5	9549 F 11	9568 J 9	9588 J 11	9610 A 12	



Mother Board PMB - Head Amplifier (HA)

Interconnections:

AF page 3-23	AL page 3-20	DC page 3-25	DE page 3-16	FV page 3-19	HA page 3-15
IO page 3-20	OS page 3-21	PS page 3-11	SD page 3-22	SE page 3-18	VS page 3-17



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
A B C D E F G H I J K
TO ROTATING TRANSFORMER
1915
VH1 SH1
VHC SHC
VH2 SH2
VH1'C LH2
VH1' LHC
LH1
AH2
AHC
AH1
GNDVS
3150 560E 330E
2150 10n 50V
3163 150k
7161 DTC124EK
2151 22n 50V
2152 220n 25V
STV5742DT
7152
CAGC REC
REC IN
TRIV
CSYN
GND2
YCPB SWR
VCC
SWIN
STV5744DT
7150
CAGC REC
REC IN
TRIV
CSYN
GND2
YCPB SWR
VCC
SWIN
ENVC
I_OUT LP
REC
I_OUT SP
I_OUT LP
SP/LP H1/H2
VCC
SP I_OUT
SP V1
SP V2
LP H2
SP H2
GND1
SP H1
LP H1
LP V2
LP V1
I_OUT V1 V2 C1 H2 GND1 H1 C2
2154 10n 50V
2156 10n 50V
2153 10n 6V3
2155 10n 50V
2157 10n 50V
2158 10n 6V3
3157 0E
3160 330E
2159 10n 6V3
3162 10k
2160 10n 50V not used
3161 27k 1%
27k
18k
2163 10n 50V
TRIV to DE
2162 10n 50V
3159 2k2
FMRV from VS
H=AGC REC
=SP/LP TRIG
REC=H
3158 39k
CSYNC from VS
FMPV from VS
SWIN from VS
7162 DTA124EK
3152 100k
2161 100p 50V
5VA
5VA from VS
5150 47u
2164 47u 16V
GNDVS from VS
3151 4k7
ISWS from DE
LP>SP=L
ENVC to DE
7160 BFS19
2165 100p 50V
5E6 560E
8E2 680E
3172
3171
2173 22p 50V
GNDVS
STV5712/TR
7151
V1
IOUT
GND2
PROT
PROT
VMES
VIN
SW-REC
SW-H
SW LOGIC
VCC V2 C2 H2 GND1 H1 C1 FMOUT
3167 1k
FMAR
3168 4k7
REC=H
RAF
3169 4k7
AH1=H
HP2
3170 100E
FMAP
from/to IO
3173 330E
2174 10n 50V
5VA
5151 47u
2169 10n 50V
2170 10n 50V
2171 10n 50V
2172 10n 50V
2166 47u 16V
2168 100n 25V
HA(40250)

0 NOT USED

1 ONLY FOR 4/2

2 ONLY FOR 2/2

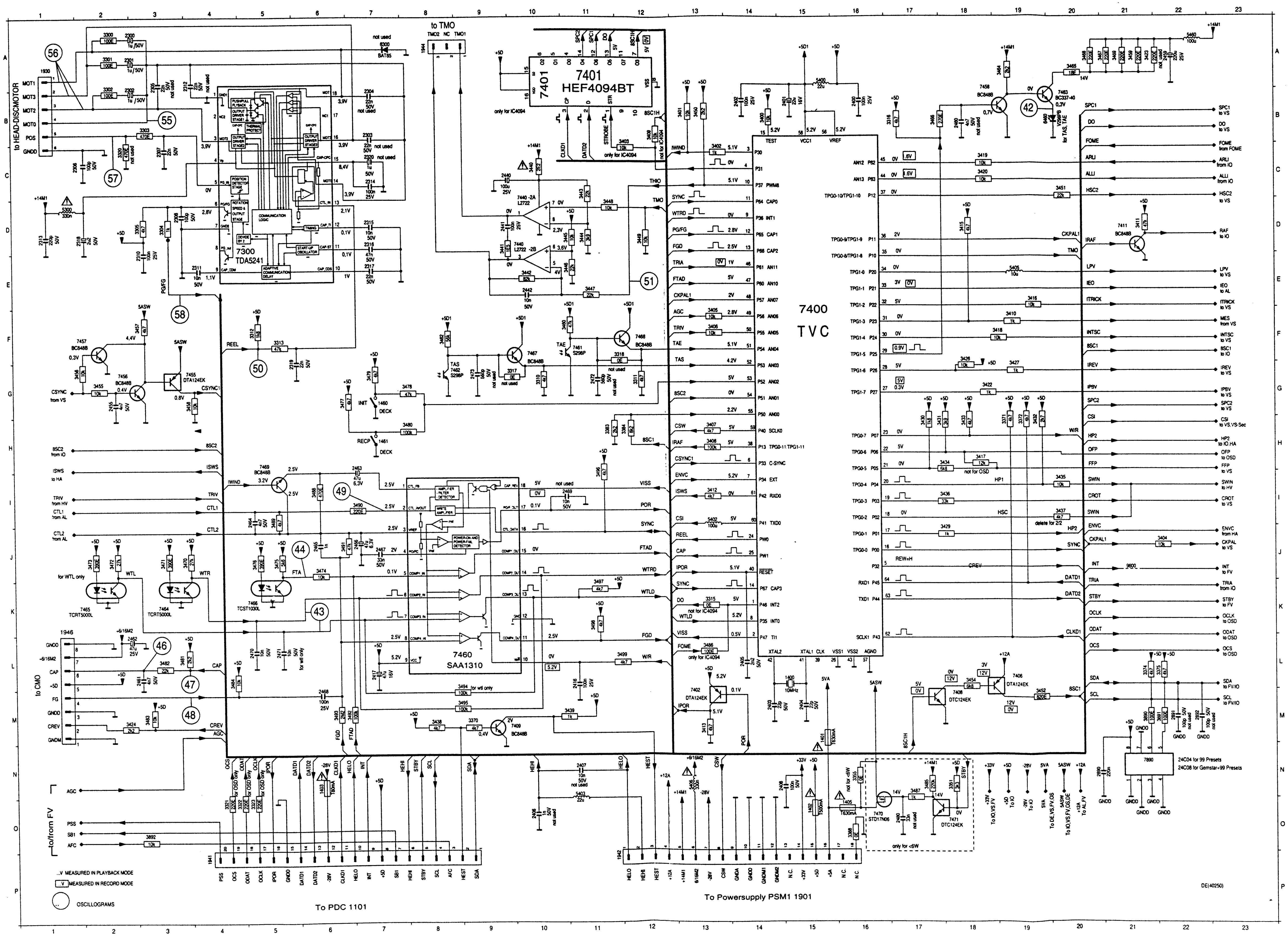
HEAD SWITCHING TABLE			
SWIN		HEAD	VARIANT
MIN	MAX		
2,5	5	VH1	2/X
0	1,5	VH2	
4,3	5	LH2	4/X
2,8	3,8	LH1	
1,3	2,3	SH1	
0	0,8	SH2	

1915	C 1
2150	D 5
2151	A 8
2152	A10
2153	F 9
2154	E10
2155	F10
2156	E10
2157	F10
2158	F11
2159	F12
2160	A14
2161	D15
2162	B14
2163	B14
2164	E13
2165	F14
2166	K 8
2168	K 8
2169	J10
2170	J10
2171	J11
2172	J11
2173	H11
2174	I 7
3150	D 5
3151	E13
3152	D14
3157	F 8
3158	C15
3159	B15
3160	F12
3161	A15
3162	A14
3163	A 7
3167	H13
3168	H13
3169	H13
3170	I13
3171	H11
3172	H10
3173	H 7
5150	D13
5151	I 8
7150	D 8
7151	I 9
7152	B 6
7160	F14
7161	A 7
7162	D14
9069	D15
9070	B15
9071	D15

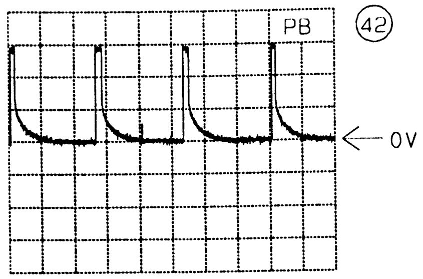
Mother Board PMB - Deck Electronics (DE)

Interconnections:

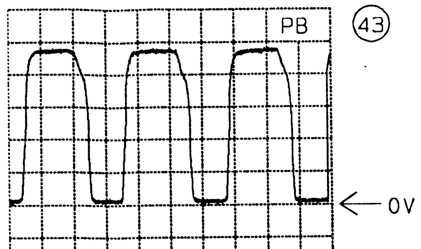
AF page 3-23	AL page 3-20	DC page 3-25	DE page 3-16	FV page 3-19	HA page 3-15
IO page 3-20	OS page 3-21	PS page 3-11	SD page 3-22	SE page 3-18	VS page 3-17


to HEAD-DISCMOTOR
MOT1
MOT3
MOT2
MOT0
POS
GNDD
7300
TDA5241
to TMO
TMO2 NC TMO1
7401
HEF4094BT
only for IC4094
7400
TVC
7460
SAA1310
to CMO
to/from FV
To PDC 1101
To Powersupply PSM1 1901
7890
24C04 for 99 Presets
24C08 for Gemstar+99 Presets
only for <6W
...V MEASURED IN PLAYBACK MODE
V MEASURED IN RECORD MODE
OSCILLOGRAMS
DE(40250)

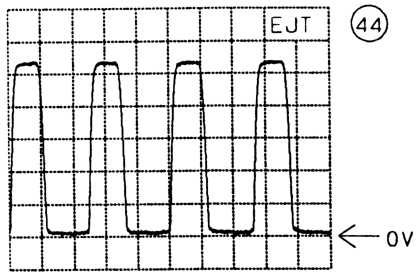
1400	L15
1401	M15
1402	O15
1403	N 6
1405	O16
1460	G 7
1461	H 7
1930	A 1
1941	P 4
1942	O11
1944	A 8
1946	K 1
2300	A 3
2301	A 3
2302	B 3
2303	B 7
2304	B 7
2305	A 3
2306	C 1
2307	C 3
2308	D 3
2310	E 3
2311	E 4
2312	A 4
2313	D 1
2314	C 7
2315	D 7
2316	D 7
2317	E 7
2318	D 2
2319	G 5
2320	C 7
2400	B16
2401	B15
2402	B14
2403	M14
2404	M15
2405	L14
2406	O10
2407	N11
2408	N14
2416	L11
2417	L 7
2440	C 9
2441	D 9
2442	E10
2455	G 2
2459	A22
2460	B18
2461	L 3
2462	L 2
2463	H 7
2464	I 5
2465	J 6
2466	J 7
2467	J 7
2468	M 6
2469	I11
2470	L 5
2471	L 5
2472	G11
2473	G 9
2480	O17
2890	N20
2891	M22
2892	M22
3300	A 2
3301	A 2
3302	B 2
3303	B 3
3304	D 3
3305	D 3
3310	G10
3311	G12
3312	F 5
3313	F 5
3315	K13
3316	B17
3317	G10
3318	F12
3320	C 2
3321	O 4
3322	O 4
3323	O 5
3351	N18
3355	N16
3370	M 9
3371	H19
3372	H19
3374	L21
3375	L22
3383	H11
3384	H12
3388	O16
3400	B14
3401	B13
3402	C13
3403	C12
3404	J22
3405	F13
3406	F13
3407	H13
3408	H13
3409	B12
3410	F19
3411	D21
3412	I13
3413	M13
3415	D18
3416	E19
3417	H18
3418	F19
3419	C18
3420	C18
3422	G18
3423	A21
3424	M 2
3426	G18
3427	G19
3429	J18
3430	H17
3431	H17
3432	H19
3433	H18
3434	H18
3435	I20
3436	I18
3437	I20
3438	M 8
3439	M11
3440	C10
3441	D 9
3442	E10
3443	C11
3444	D11
3445	D11
3446	E11
3447	E11
3448	D11
3449	D12
3450	B13
3451	C20
3452	M19
3454	L18
3455	G 2
3456	G 1
3457	F 3
3458	G 4
3459	A21
3460	F11
3462	F 8
3464	A19
3465	A20
3466	B17
3467	A21
3468	A20
3469	A21
3470	J 3
3471	J 3
3472	J 2
3473	J 2
3474	J 6
3475	J 5
3476	J 5
3477	G 6
3478	G 8
3479	G 7
3480	H 8
3481	L 3
3482	L 3
3483	M 3
3484	L 4
3485	N17
3486	L13
3487	N17
3488	I 6
3489	I 5
3490	I 7
3491	J 6
3492	M 6
3493	M 6
3494	M 9
3495	M 9
3496	I11
3497	K11
3498	K11
3499	L12
3890	M21
3891	M22
3892	O 3
5300	D 1
5400	A15
5402	I13
5403	N11
5405	E19
5406	N13
5460	A22
6300	A 7
6460	B20
7300	D 4
7400	F15
7401	A10
7402	L13
7406	L19
7408	M18
7409	M 9
7411	D21
7440	D10
7440	D10
7455	G 3
7456	G 2
7457	F 1
7458	A18
7460	L 8
7461	F11
7462	G 3
7463	B20
7464	K 3
7465	K 2
7466	K 5
7467	F10
7468	F12
7469	H 5
7470	O16
7471	O18
7890	N21
9072	L22
9073	L22
9482	M12
9484	J11
9600	J21



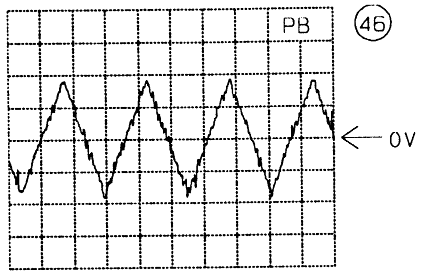
A: DC, 500mV/Div, 5ms/Div
Transistor 7463 Emitter



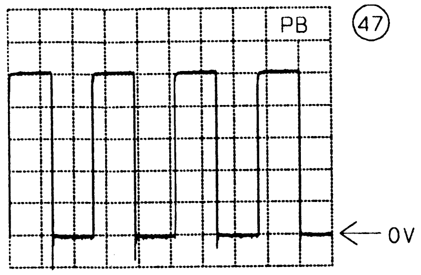
A: DC, 1 V/Div, 200ms/Div
IC 7460 Pin 6



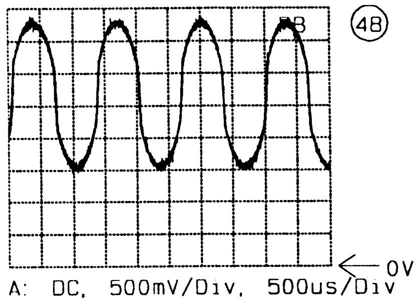
A: DC, 1 V/Div, 10ms/Div
Resistor 3474



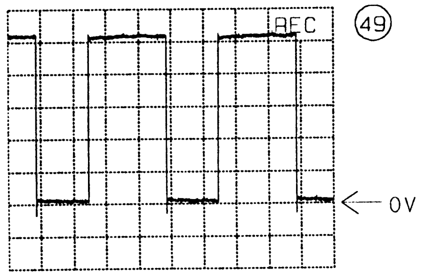
A: AC, 100mV/Div, 10us/Div
Connector 1946 Pin 6



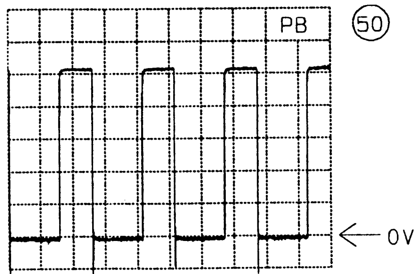
A: DC, 1 V/Div, 10us/Div
Resistor 3482/3481



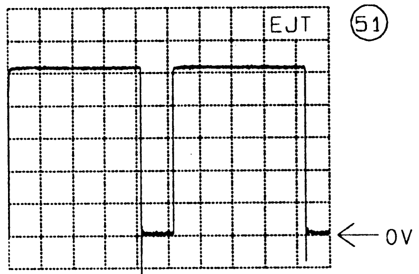
A: DC, 500mV/Div, 500us/Div
Connector 1946 Pin 4



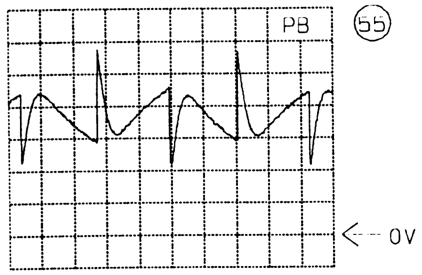
A: DC, 1 V/Div, 10ms/Div
IC 7460 Pin 2



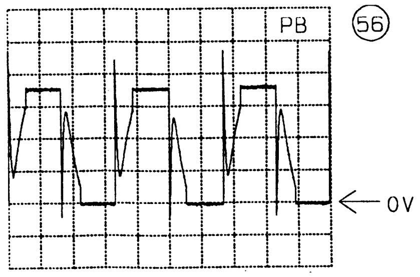
A: DC, 1 V/Div, 10us/Div
Resistor 3312



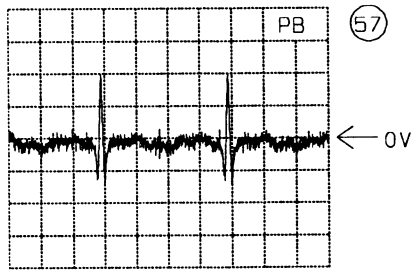
A: DC, 1 V/Div, 10us/Div
IC 7400 Pin 10



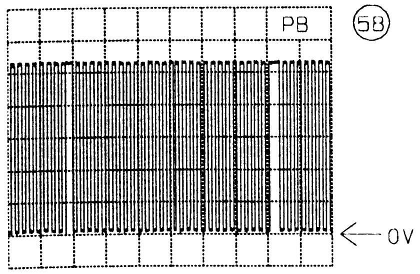
A: DC, 1 V/Div, 500us/Div
Connector 1930 Pin 4



A: DC, 2 V/Div, 2ms/Div
Conector 1930 Pin 1-3

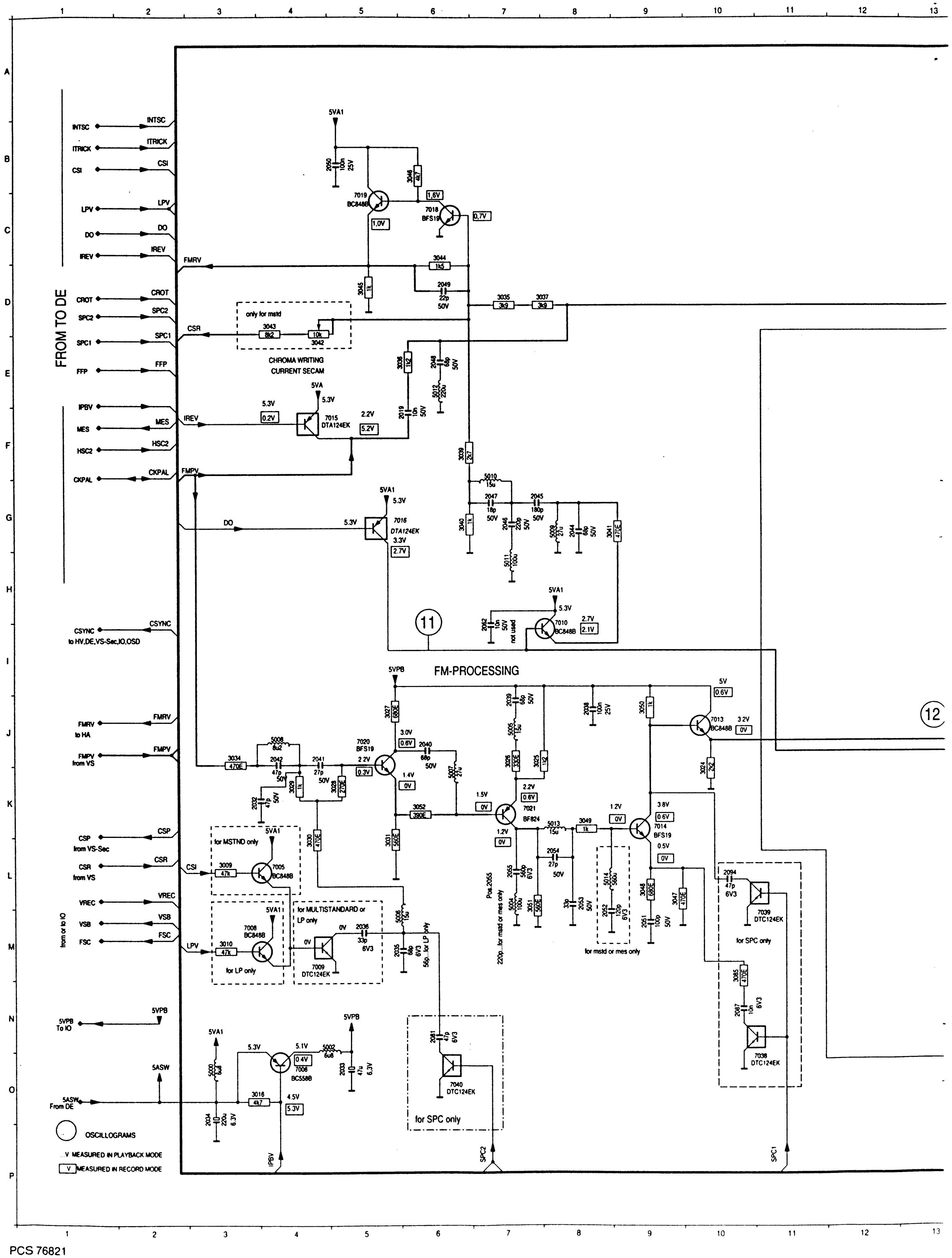


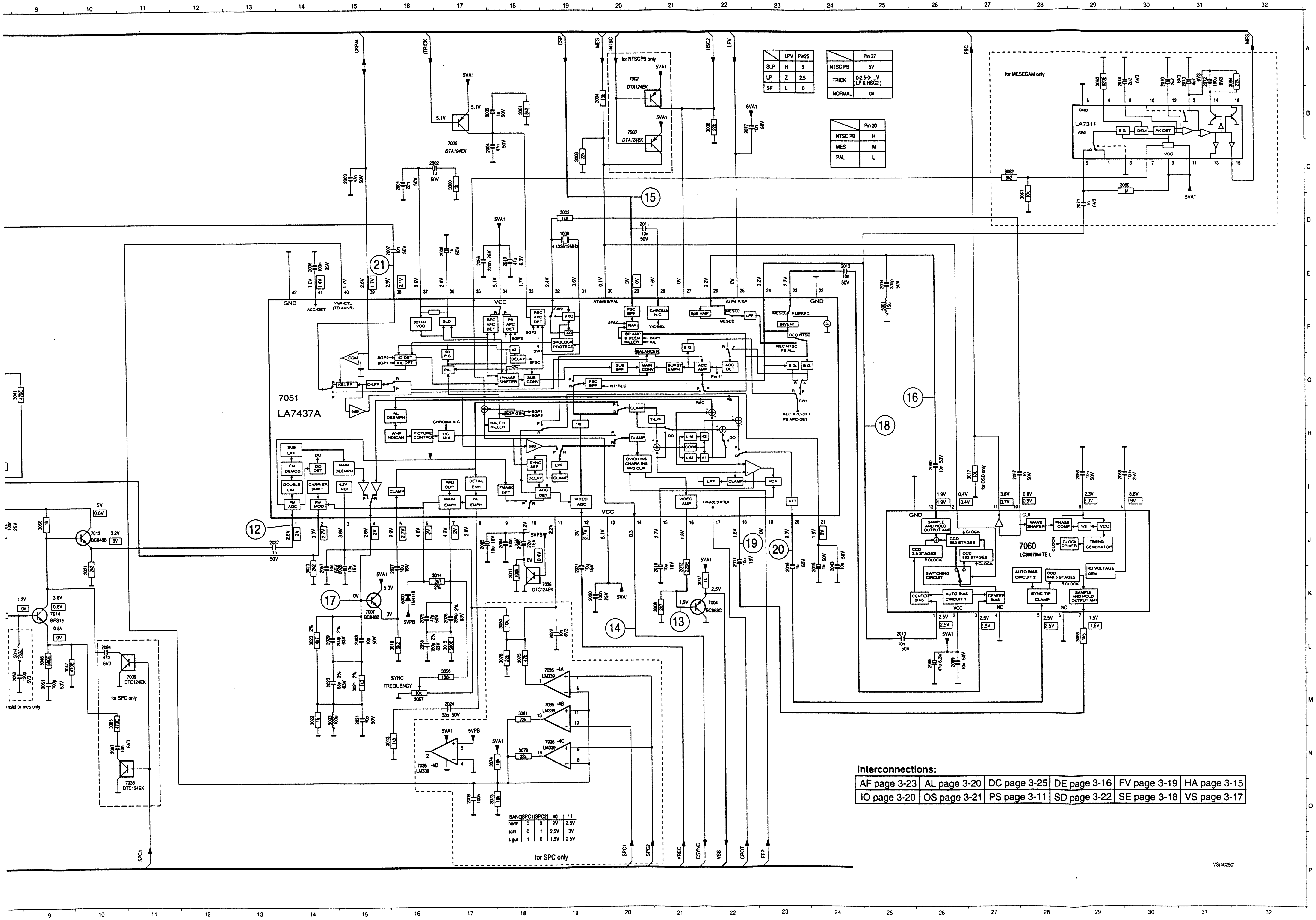
A: AC, 100mV/Div, 10ms/Div
Connector 1930 Pin 5



A: DC, 1 V/Div, 10ms/Div
Resistor 3304

Mother Board PMB - Video Signal Processing (VS)


FROM TO DE
INTSC
ITRICK
CSI
LPV
DO
IREV
CROT
SPC2
SPC1
FFP
IPBV
MES
HSC2
CKPAL
FMRV
CSR
FMPV
5VA1
7019 BC848B
7018 BFS19
1.6V
1.0V
0.7V
only for mstd
CHROMA WRITING CURRENT SECAM
5VA
5.3V
0.2V
7015 DTA124EK
2.2V
5.2V
7016 DTA124EK
3.3V
2.7V
CSYNC
CSYNC to HV,DE,VS-Sec,IO,OSD
11
7010 BC848B
2.7V
2.1V
5VPB
FM-PROCESSING
5V
0.6V
7013 BC848B
3.2V
0V
12
FMRV to HA
FMPV from VS
7020 BFS19
3.0V
0.6V
2.2V
0.3V
1.4V
0V
1.5V
0V
7021 BF824
2.2V
0.8V
1.2V
0V
1.2V
0V
3.8V
0.6V
7014 BFS19
0.5V
0V
CSP from VS-Sec
CSR from VS
VREC
VSB
FSC
from or to IO
for MSTND only
7005 BC848B
for MULTISTANDARD or LP only
7008 BC848B
7009 DTC124EK
for LP only
for mstd or mes only
7039 DTC124EK
for SPC only
7038 DTC124EK
5VPB To IO
5ASW
5ASW From DE
5.3V
5.1V
0.4V
7006 BC558B
4.5V
5.3V
7040 DTC124EK
for SPC only
IPBV
SPC2
SPC1
OSCILLOGRAMS
V MEASURED IN PLAYBACK MODE
V MEASURED IN RECORD MODE
1 2 3 4 5 6 7 8 9 10 11 12 13
A B C D E F G H I J K L M N O P


9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
CKPAL
ITRICK
CSP
MES
INTSC
HSC2
LPV
FSC
MES
for NTSCPB only
7002
DTA124EK
7003
DTA124EK
7000
DTA124EK
5VA1
5.1V
for MESECAM only
LA7311
7050
B.G
DEM
PK DET
VCC
GND
7051
LA7437A
7060
LC89979M-TE-L
1000
4.433619MHz
SUB LPF
FM DEMOD
DOUBLE LIM
FM AGC
CARRIER SHIFT
FM MOD
MAIN DEEMPH
4.2V REF
CLAMP
W/D CLIP
MAIN EMPH
DETAIL ENH
NL EMPH
FMAGC DET
SYNC SEP
DELAY
AGC DET
VIDEO AGC
NL DEEMPH
WHIP NOICAN
PICTURE CONTROL
Y/C MIX
CHROMA N.C.
HALF H KILLER
BGP GEN
KILLER
C-LPF
COM
6dB
1D-DET
KIL-DET
321FH VCO
SLD
REC AFC DET
PB APC DET
REC APC DET
VXO
XO
3RDLOCK PROTECT
90 P.S.
PAL
DELAY
4PHASE SHIFTER
SUB CONV
FSC BPF
NAP
CHROMA N.C
Y/C-MIX
BP AMP
B.DEEM
KILLER
BALANCER
SUB BPF
MAIN CONV
BURST EMPH
ACC AMP
ACC DET
6dB AMP
MESEC
LPF
INVERT
REC NTSC
REC NTSC PB ALL
SW1
REC APC-DET
PB APC-DET
Y-LPF
LIM
COMB
QV/QH INS CHARA INS W/D CLIP
VIDEO AMP
4 PHASE SHIFTER
ATT
VCA
GND
VCC
ACC-DET
YNR-CTL (TO AVNS)
NT/MES/PAL
SLP/LP/SP
SAMPLE AND HOLD OUTPUT AMP
CCD 2.5 STAGES
CCD 853 STAGES
CCD 852 STAGES
SWITCHING CIRCUIT
CENTER BIAS
AUTO BIAS CIRCUIT 1
AUTO BIAS CIRCUIT 2
CCD 848.5 STAGES
SYNC TIP CLAMP
SAMPLE AND HOLD OUTPUT AMP
WAVE SHAPER
PHASE COMP
1/3
VCO
CLOCK DRIVER
TIMING GENERATOR
RD VOLTAGE GEN
CLK
NC
7013
BC848B
7014
BFS19
7039
DTC124EK
7038
DTC124EK
for SPC only
mesid or mes only
7007
BC848B
6000
1N4148
SYNC FREQUENCY
7036
DTC124EK
7004
BC858C
7035 -4A
LM339
7035 -4B
LM339
7035 -4C
LM339
7035 -4D
LM339
5VPB
5VA1
for SPC only
12
13
14
15
16
17
18
19
20
21
SPC1
SPC1
SPC2
VREC
CSYNC
VSB
CROT
FFP
VS(40250)

	LPV	Pin25
SLP	H	5
LP	Z	2.5
SP	L	0

	Pin 27
NTSC PB	5V
TRICK	0-2,5-0- ...V (LP & HSC2)
NORMAL	0V

	Pin 30
NTSC PB	H
MES	M
PAL	L

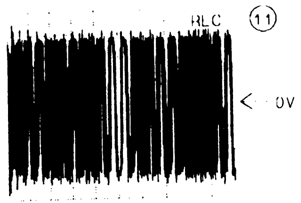
BAND	SPC1	SPC2	40	11
norm	0	0	2V	2.5V
schl	0	1	2,5V	3V
s.gut	1	0	1,5V	2.5V

Interconnections:

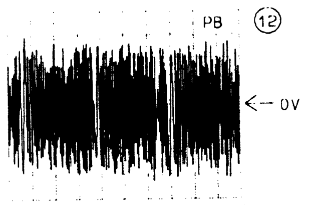
AF page 3-23	AL page 3-20	DC page 3-25	DE page 3-16	FV page 3-19	HA page 3-15
IO page 3-20	OS page 3-21	PS page 3-11	SD page 3-22	SE page 3-18	VS page 3-17

1000	D19
2001	C16
2002	C16
2003	C15
2004	C18
2005	B18
2006	E14
2007	E16
2008	E17
2009	O17
2010	E18
2011	D20
2012	E24
2013	L25
2014	E25
2015	K24
2016	K23
2017	J22
2018	K21
2019	F 6
2020	K19
2021	K19
2022	L19
2023	M14
2024	M17
2025	K16
2026	K17
2027	K16
2028	K15
2029	L14
2031	M15
2032	K 3
2033	O 5
2034	O 3
2035	M 5
2036	M 5
2037	J13
2038	J 8
2039	J 7
2040	J 6
2041	J 4
2042	J 4
2043	K24
2044	G 8
2045	G 7
2046	G 7
2047	G 7
2048	E 6
2049	D 6
2050	B 5
2051	M 9
2052	M 8
2053	L 8
2054	L 8
2055	L 7
2056	E17
2057	K14
2058	L16
2060	I26
2062	I 7
2065	L26
2066	I29
2067	I27
2068	I29
2069	L26
2070	A30
2071	D29
2072	A31
2073	A31
2074	A30
2077	B22
2081	N 6
2083	L15
2084	J18
2085	J17
2086	J18
2087	N10
2094	L10
3000	C17
3001	B18
3002	D19
3003	C19
3004	B20
3006	B22
3007	K21
3008	K21
3009	L 3
3010	M 3
3011	K18
3012	K21
3013	N15
3014	K16
3015	L17
3016	O 3
3017	I27
3018	L16
3020	L14
3021	M15
3022	M14
3023	K14
3024	K10
3025	J 7
3026	J 7
3027	J 5
3028	K 5
3029	K 4
3030	L 4
3031	L 5
3034	J 3
3035	D 7
3036	E 6
3037	D 8
3039	F 6
3040	G 6
3041	G 8
3042	E 4
3043	D 4
3044	C 6
3045	D 5
3046	B 6
3047	L 9
3048	L 9
3049	K 8
3050	J 9
3051	L 7
3052	K 6
3056	L17
3057	M16
3060	C30
3061	D28
3062	C27
3063	A29
3064	A32
3068	L29
3073	O17
3074	N17
3075	L18
3076	L18
3079	N18
3080	L18
3081	M18
3085	M10
5000	O 3
5001	F25
5002	N 4
5003	M14
5004	L 7
5005	J 7
5006	M 5
5007	K 6
5008	J 4
5009	G 8
5010	F 7
5011	H 7
5012	E 6
5013	K 8
5014	L 8
6000	K16
7000	C17
7002	A20
7003	B20
7004	K22
7005	L 4
7006	O 4
7007	K15
7008	M 3
7009	M 4
7010	I 8
7013	J10
7014	K 9
7015	F 4
7016	G 5
7018	C 6
7019	C 5
7020	J 5
7021	K 7
7035	N16
7035	L19
7035	N19
7035	M19
7036	K19
7038	O11
7039	M11
7040	O 6
7050	B29
7051	G13
7060	J28

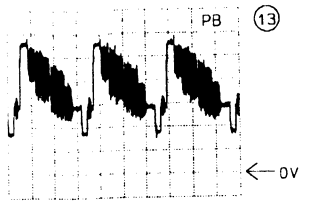
Oscillograms



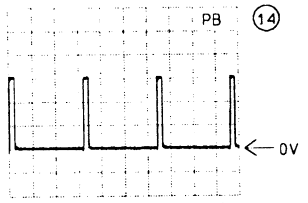
A: AC, 200mV/Div, 500ns/Div
Transistor 7010 Basis



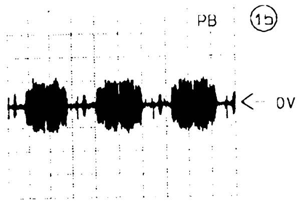
A: AC, 100mV/Div, 20us/Div
IC 7051 Pin 1



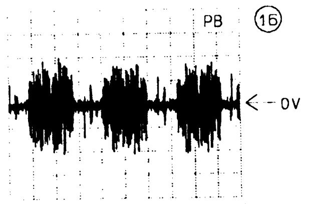
A: DC, 500mV/Div, 20us/Div
Resistor 7004 Basis



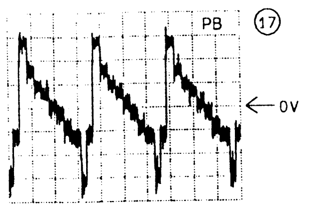
A: DC, 1 V/Div, 20us/Div
IC 7051 Pin 14



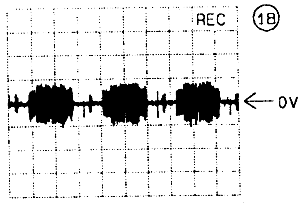
A: AC, 200mV/Div, 20us/Div
IC 7051 Pin 29



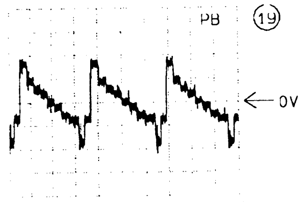
A: AC, 100mV/Div, 20us/Div
IC 7051 Pin 26



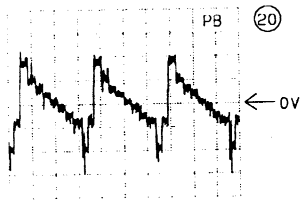
A: AC, 100mV/Div, 20us/Div
IC 7051 Pin 4



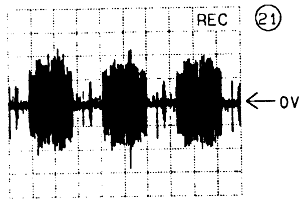
A: AC, 200mV/Div, 20us/Div
IC 7051 Pin 24



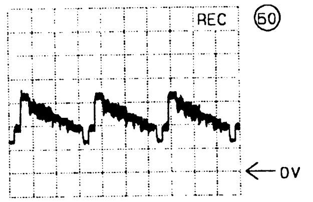
A: AC, 100mV/Div, 20us/Div
IC 7051 Pin 18



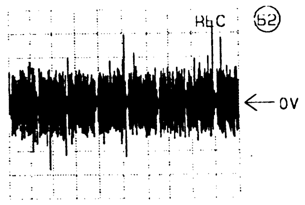
A: AC, 100mV/Div, 20us/Div
IC 7051 Pin 20



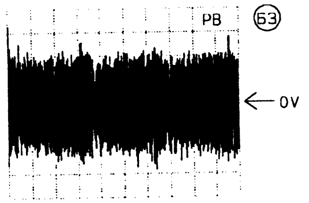
A: AC, 100mV/Div, 20us/Div
IC 7051 Pin 38



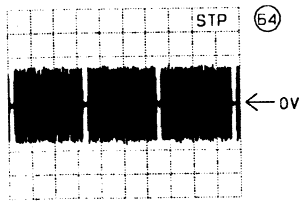
A: DC, 500mV/Div, 20us/Div
Capacitor 2114



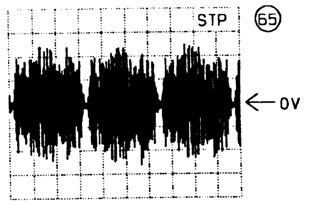
A: AC, 50mV/Div, 50us/Div
IC 7110 Pin 29



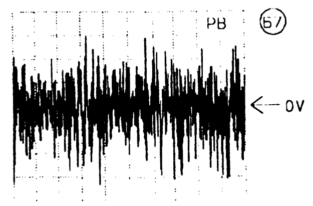
A: AC, 50mV/Div, 20us/Div
IC 7110 Pin 23



A: AC, 200mV/Div, 20us/Div
IC 7110 Pin 18



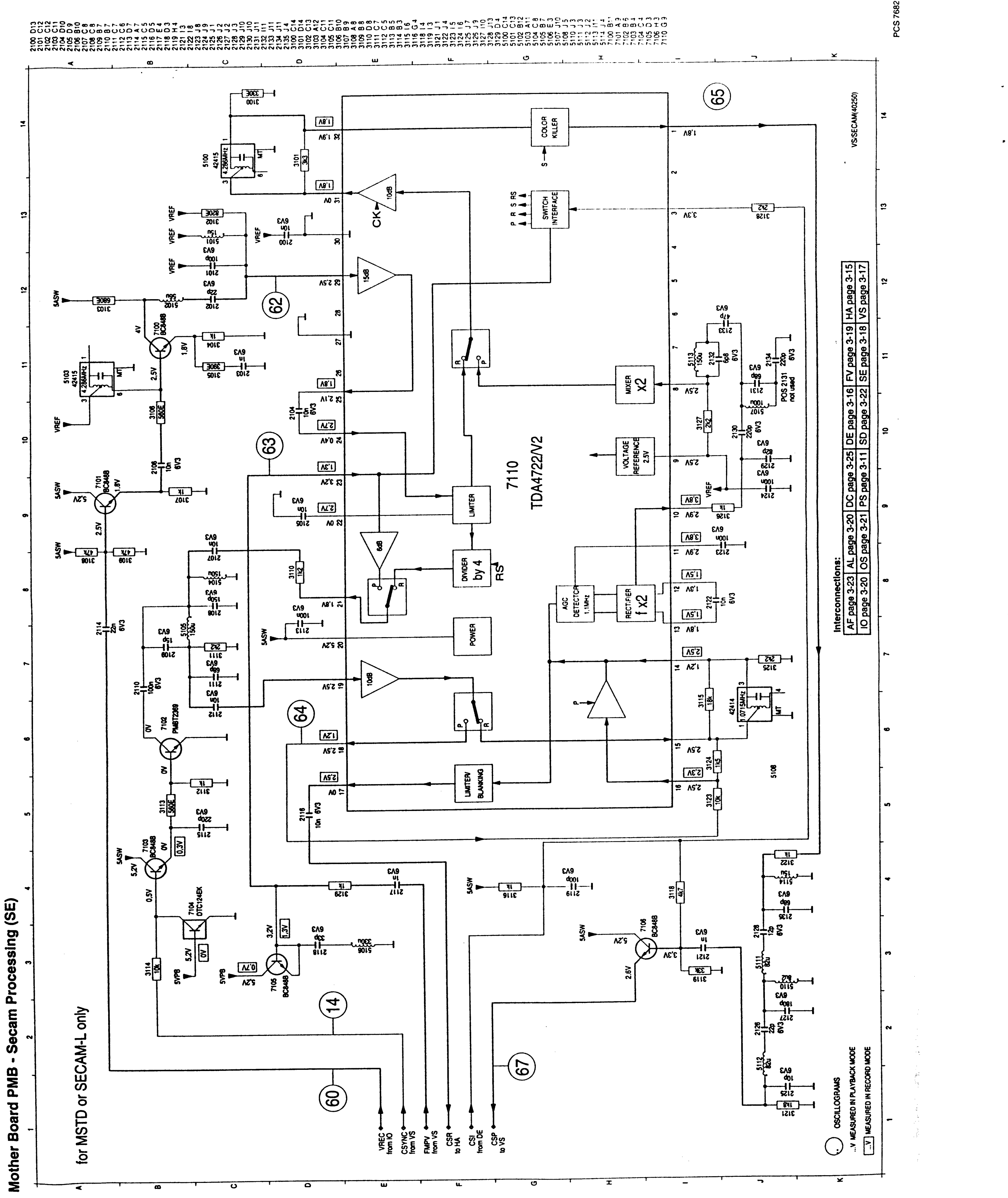
A: AC, 200mV/Div, 20us/Div
IC 7110 Pin 1



A: AC, 50mV/Div, 20us/Div
Transistor 7106 Emitter

Mother Board PMB - Secam Processing (SE)

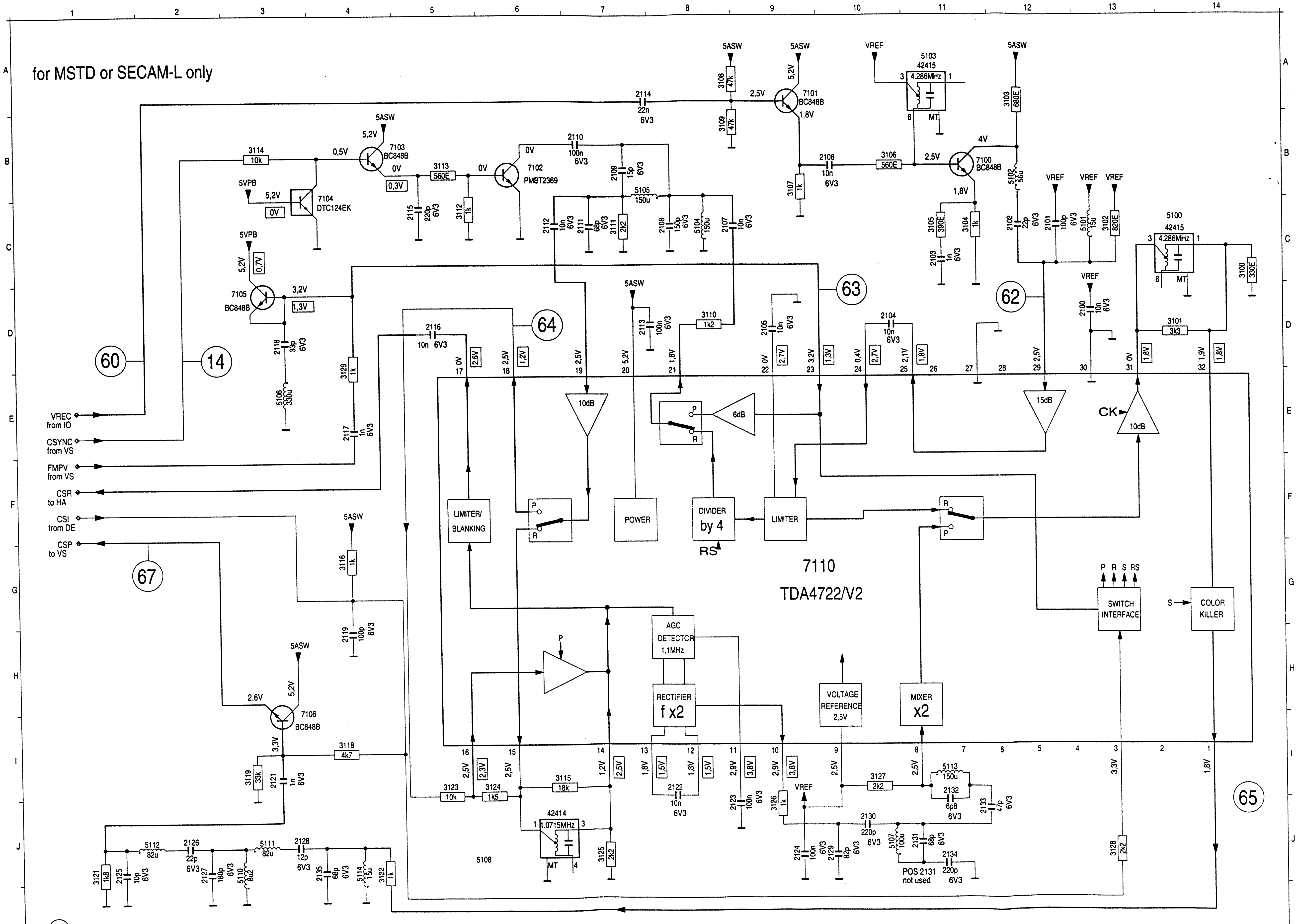
for MSTD or SECAM-L only


7110
TDA4722/V2
COLOR KILLER
SWITCH INTERFACE
MIXER x2
VOLTAGE REFERENCE 2.5V
LIMITER
DIVIDER by 4
POWER
AGC DETECTOR 1.1MHz
RECTIFIER f x2
LIMITER BLANKING
CK
RS
VREF
5ASW
5VPB
VREC from IO
CSYNC from VS
FMPV from VS
CSR to HA
CSI from DE
CSP to VS
VS/SECAM(40250)
OSCILLOGRAMS
_V MEASURED IN PLAYBACK MODE
[_V] MEASURED IN RECORD MODE

Interconnections:

AF page 3-23	AL page 3-25	DC page 3-20	DE page 3-16	FV page 3-19	HA page 3-15
IO page 3-20	OS page 3-21	PS page 3-11	SD page 3-22	SE page 3-18	VS page 3-17

Mother Board PMB - Secam Processing (SE)


for MSTD or SECAM-L only
1
2
3
4
5
6
7
8
9
10
11
12
13
14
A
B
C
D
E
F
G
H
I
J
K
VREC from IO
CSYNC from VS
FMPV from VS
CSR to HA
CSI from DE
CSP to VS
60
14
67
64
63
62
65
5ASW
5VPB
VREF
3114 10k
7103 BC848B
7104 DTC124EK
7102 PMBT2369
7105 BC848B
7106 BC848B
7101 BC848B
7100 BC848B
3113 560E
3112 1k
2115 220p 6V3
2110 100n 6V3
2109 15p 6V3
5105 150u
2112 10n 6V3
2111 68p 6V3
3111 2k2
2108 150p 6V3
5104 150u
2107 10n 6V3
2114 22n 6V3
3108 47k
3109 47k
2106 10n 6V3
3106 560E
3107 1k
5103 42415 4.286MHz
3103 680E
5102 56u
3105 390E
3104 1k
2103 1n 6V3
2102 22p 6V3
2101 100p 6V3
5101 15u
3102 820E
5100 42415 4.286MHz
3100 330E
2100 10n 6V3
3101 3k3
2104 10n 6V3
2105 10n 6V3
2113 100n 6V3
3110 1k2
2116 10n 6V3
2118 33p 6V3
5106 330u
3129 1k
2117 1n 6V3
3116 1k
2119 100p 6V3
3118 4k7
3119 33k
2121 1n 6V3
3123 10k
3124 1k5
3115 18k
42414 1.0715MHz
5108
3125 2k2
2122 10n 6V3
2123 100n 6V3
3126 1k
3127 2k2
5113 150u
2132 6p8 6V3
2133 47p 6V3
2130 220p 6V3
2124 100n 6V3
2129 82p 6V3
5107 100u
2131 68p 6V3
2134 220p 6V3
POS 2131 not used
3128 2k2
3121 1k8
2125 10p 6V3
5112 82u
2126 22p 6V3
2127 180p 6V3
5110 8u2
5111 82u
2128 12p 6V3
2135 68p 6V3
5114 15u
3122 1k
7110
TDA4722/V2
10dB
6dB
15dB
10dB
CK
LIMITER/ BLANKING
POWER
DIVIDER by 4
RS
LIMITER
SWITCH INTERFACE
P R S RS
COLOR KILLER
S
AGC DETECTOR 1,1MHz
RECTIFIER f x2
VOLTAGE REFERENCE 2,5V
MIXER x2
P
R
MT
0,5V
5,2V
0V
0,3V
3,2V
1,3V
0,7V
2,5V
1,8V
4V
2,6V
3,3V
1,2V
2,9V
3,8V
2,7V
0,4V
2,1V
1,9V
2,3V

○ OSCILLOGRAMS

...V MEASURED IN PLAYBACK MODE

$\boxed{...V}$ MEASURED IN RECORD MODE

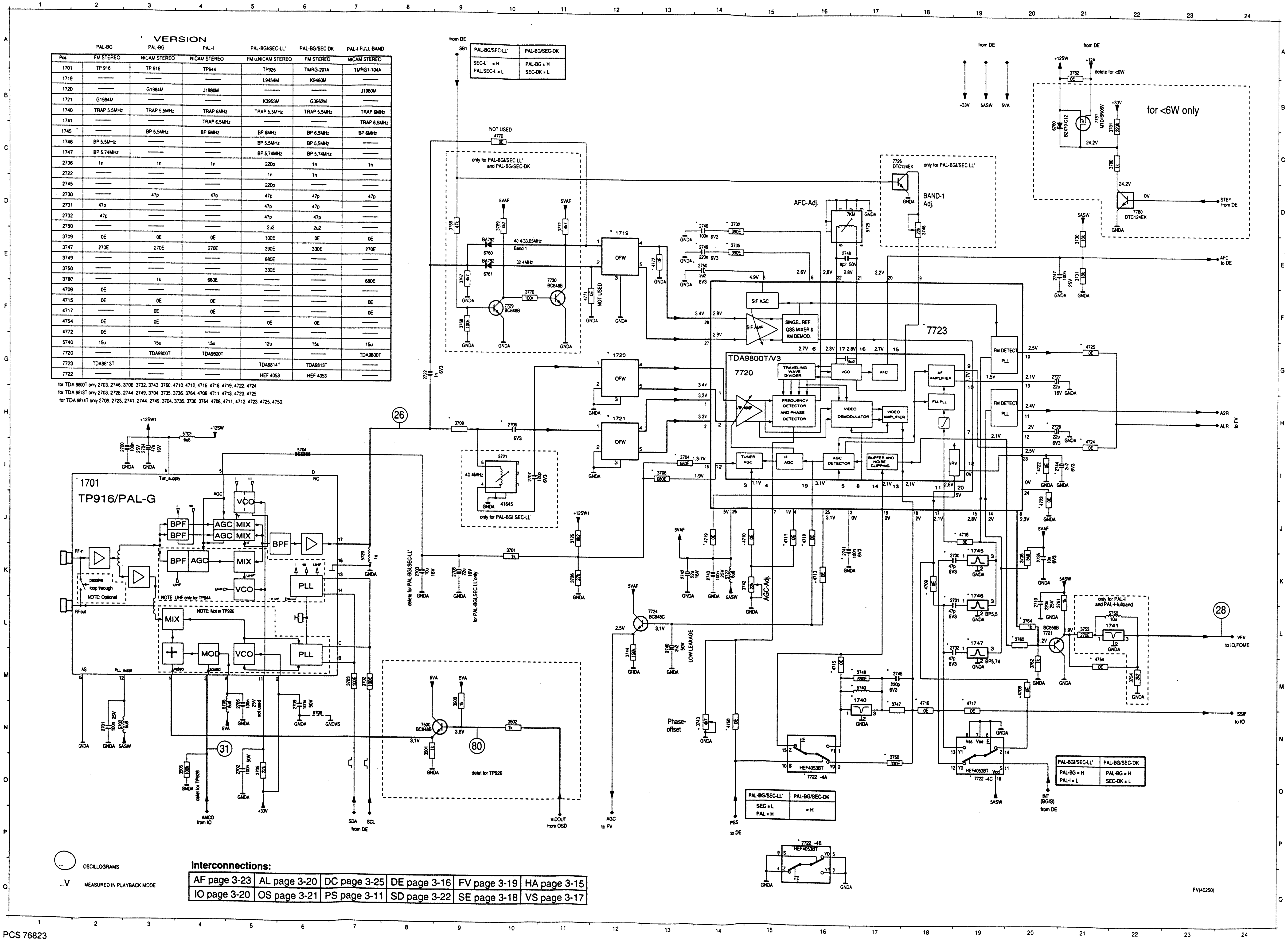
Interconnections:

AF page 3-23	AL page 3-20	DC page 3-25	DE page 3-16	FV page 3-19	HA page 3-15
IO page 3-20	OS page 3-21	PS page 3-11	SD page 3-22	SE page 3-18	VS page 3-17

VS/SECAM(40250)

2100	D13
2101	C12
2102	C12
2103	C11
2104	D10
2105	D 9
2106	B10
2107	C 8
2108	C 8
2109	B 7
2110	B 7
2111	C 7
2112	C 6
2113	D 7
2114	A 7
2115	C 5
2116	D 5
2117	E 4
2118	D 3
2119	H 4
2121	I 3
2122	I 8
2123	J 8
2124	J 9
2125	J 1
2126	J 2
2127	J 2
2128	J 3
2129	J10
2130	J10
2131	J11
2132	I11
2133	J11
2134	J11
2135	J 4
3100	C14
3101	D14
3102	C13
3103	A12
3104	C11
3105	C11
3106	B10
3107	B 9
3108	A 8
3109	B 8
3110	D 8
3111	C 7
3112	C 5
3113	B 5
3114	B 3
3115	I 6
3116	G 4
3118	I 4
3119	I 3
3121	J 1
3122	J 4
3123	I 5
3124	I 6
3125	J 7
3126	J 9
3127	I10
3128	J13
3129	D 4
5100	C14
5101	C13
5102	B12
5103	A11
5104	C 8
5105	B 7
5106	E 3
5107	J10
5108	J 5
5110	J 3
5111	J 3
5112	J 2
5113	I11
5114	J 4
7100	B11
7101	A 9
7102	B 6
7103	B 4
7104	C 4
7105	D 3
7106	H 3
7110	G 9

Mother Board PMB - Frontend (FV)


from DE
S81
PAL-BG/SEC-LL'
PAL-BG/SEC-DK
SEC-L' = H
PAL.SEC-L = L
PAL-BG = H
SEC-DK = L
NOT USED
4770
only for PAL-BGI/SEC LL' and PAL-BG/SEC-DK
5VAF
BA792
6760
6761
43.4/33.05MHz Band 1
32.4MHz
7729 BC848B
7730 BC848B
3770 100k
1719
OFW
1720
1721
4771
NOT USED
GNDA
26
3709
2706 6V3
5721
40.4MHz
41645
only for PAL-BGI,SEC-LL'
+12SW1
+12SW
5703 6u8
5704
1701
TP916/PAL-G
Tun_supply
AGC
RF-in
RF-out
BPF
AGC
MIX
VCO
PLL
MOD
passive loop through
NOTE: Optional
NOTE: UHF only for TP944
NOTE: Not in TP926
video
sound
AS
PLL_suppl
3701 1k
delete for PAL-BGI,SEC-LL'
for PAL-BGI,SEC LL only
31
5VA
7500 BC848B
3502 1k
3500 1k
3501 1k
80
delet for TP926
AMCO from IO
SDA
SCL
from DE
VIDOUT from OSD
delete for TP926
AGC to FV
5VAF
7724 BC848C
2.5V
3.1V
LOW LEAKAGE
Phase-offset
PSS to DE
PAL-BG/SEC-LL'
PAL-BG/SEC-DK
SEC = L
PAL = H
= H
AFC-Adj.
7KM
5725
7726 DTC124EK
only for PAL-BGI/SEC LL'
BAND-1 Adj.
7723
TDA9800T/V3
7720
SIF AGC
SIF AMP
SINGEL REF. QSS MIXER & AM DEMOD.
TRAVELING WAVE DIVIDER
VCO
AFC
VIF AMP
FREQUENCY DETECTOR AND PHASE DETECTOR
VIDEO DEMODULATOR
VIDEO AMPLIFIER
AF AMPLIFIER
FM-PLL
TUNER AGC
IF AGC
AGC DETECTOR
BUFFER AND NOISE CLIPPING
IRV
FM DETECT PLL
AGC-Adj.
1740
1745
1746 BP5,5
1747 BP5,74
HEF4053BT
7722 -4A
7722 -4C
7722 -4B
INT (BGIS) from DE
5ASW
PAL-BG/SEC-LL'
PAL-BG/SEC-DK
PAL-BG = H
PAL-I = L
PAL-BG = H
SEC-DK = L
from DE
+33V
5ASW
5VA
+12SW
+12A
delete for <6W
for <6W only
6780 BZX79-C12
7781 MTD15N06V
24.2V
7780 DTC124EK
STBY from DE
AFC to DE
A2R
ALR
to FV
only for PAL-I and PAL-I-fullband
5750 10u
1741
BC858B 7721
28
VFV to IO,FOME
SSIF to IO
FV(40250)

VERSION

Pos	PAL-BG FM STEREO	PAL-BG NICAM STEREO	PAL-I NICAM STEREO	PAL-BGI/SEC-LL' FM u.NICAM STEREO	PAL-BG/SEC-DK FM STEREO	PAL-I-FULL-BAND NICAM STEREO
1701	TP 916	TP 916	TP944	TP926	TMRG-201A	TMRG1-104A
1719	——	——	——	L9454M	K9460M	——
1720	——	G1984M	J1980M	——	——	J1980M
1721	G1984M	——	——	K3953M	G3962M	——
1740	TRAP 5.5MHz	TRAP 5.5MHz	TRAP 6MHz	TRAP 5.5MHz	TRAP 5.5MHz	TRAP 6MHz
1741	——	——	TRAP 6.5MHz	——	——	TRAP 6.5MHz
1745	——	BP 5.5MHz	BP 6MHz	BP 6MHz	BP 6.5MHz	BP 6MHz
1746	BP 5.5MHz	——	——	BP 5.5MHz	BP 5.5MHz	——
1747	BP 5.74MHz	——	——	BP 5.74MHz	BP 5.74MHz	——
2706	1n	1n	1n	220p	1n	1n
2722	——	——	——	1n	1n	——
2745	——	——	——	220p	——	——
2730	——	47p	47p	47p	47p	47p
2731	47p	——	——	47p	47p	——
2732	47p	——	——	47p	47p	——
2750	——	——	——	2u2	2u2	——
3709	0E	0E	0E	100E	0E	0E
3747	270E	270E	270E	390E	330E	270E
3749	——	——	——	680E	——	——
3750	——	——	——	330E	——	——
3760	——	1k	680E	——	——	680E
4709	0E	——	——	——	——	——
4715	0E	0E	0E	——	——	0E
4717	——	0E	0E	——	——	0E
4754	0E	0E	——	0E	0E	——
4772	0E	——	——	——	——	——
5740	15u	15u	15u	12u	15u	15u
7720	——	TDA9800T	TDA9800T	——	——	TDA9800T
7723	TDA9813T	——	——	TDA9814T	TDA9813T	——
7722	——	——	——	HEF 4053	HEF 4053	——

for TDA 9800T only 2703. 2746. 3706. 3732. 3743. 3760. 4710. 4712. 4716 4718. 4719. 4722. 4724.

for TDA 9813T only 2703. 2726. 2744. 2749. 3704. 3735. 3736. 3764. 4708. 4711. 4713. 4723. 4725.

for TDA 9814T only 2708. 2726. 2741. 2744. 2749. 3704. 3735. 3736. 3764. 4708. 4711. 4713. 4723. 4725. 4750.

OSCILLOGRAMS

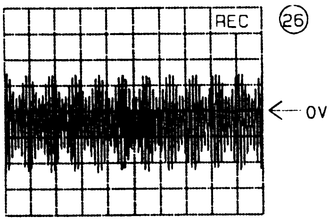
..V MEASURED IN PLAYBACK MODE

Interconnections:

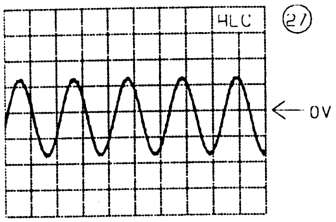
AF page 3-23	AL page 3-20	DC page 3-25	DE page 3-16	FV page 3-19	HA page 3-15
IO page 3-20	OS page 3-21	PS page 3-11	SD page 3-22	SE page 3-18	VS page 3-17

1701	I 2
1719	E12
1720	G12
1721	H12
1740	M17
1741	L21
1745	K19
1746	K19
1747	L19
2700	I 3
2701	N 2
2702	O 5
2703	K 8
2704	I 3
2705	N 5
2706	H10
2707	I10
2708	K 9
2709	N 6
2710	K20
2722	G 8
2727	G20
2728	H20
2730	K19
2731	K19
2732	L19
2735	K20
2740	L13
2741	K16
2742	K13
2743	K14
2744	I21
2745	M17
2746	D14
2747	E20
2748	E16
2749	E14
2750	E14
3500	M 9
3501	N 8
3502	N10
3505	O 4
3701	K10
3702	M 7
3703	M 7
3704	I13
3705	O 5
3706	I13
3709	H 9
3725	J11
3726	K11
3730	E21
3731	E21
3732	D14
3735	E14
3736	K20
3742	K14
3743	N14
3744	L12
3747	M17
3748	D18
3749	M17
3750	N17
3753	L21
3754	M22
3760	L20
3761	K21
3762	M20
3764	L20
3766	D 9
3767	E 9
3768	F 9
3769	D10
3770	F10
3771	D11
3780	C22
3781	B22
3782	A21
4708	M20
4709	K18
4710	J15
4711	J15
4712	J16
4713	K16
4715	M16
4716	M18
4717	M19
4718	J19
4719	J14
4722	I20
4723	J20
4724	H21
4725	G21
4750	N14
4754	M21
4770	C10
4771	F11
4772	E13
5702	N 2
5703	H 4
5704	I 6
5705	N 4
5720	K 7
5721	I10
5725	D17
5727	K14
5740	M17
5750	L22
6760	E10
6761	E10
6780	B20
7500	N 8
7720	G14
7721	L20
7722	O16
7722	P16
7722	O19
7723	F18
7724	L13
7726	C17
7729	F10
7730	E11
7780	D22
7781	B21
9708	N 6

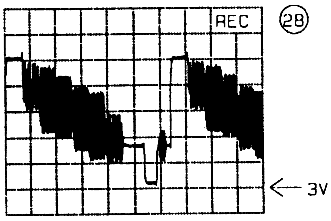
Oscillograms FV



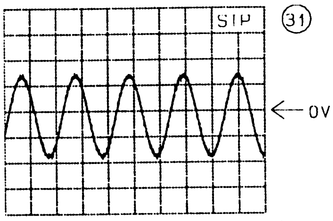
A: DC, 200mV/Div, 200ns/Div
Tuner 1701 Pin 17



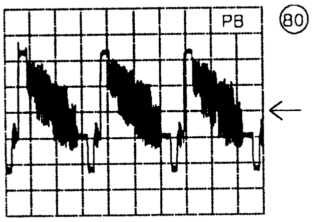
A: AC, 500mV/Div, 500us/Div
Capacitor 2751



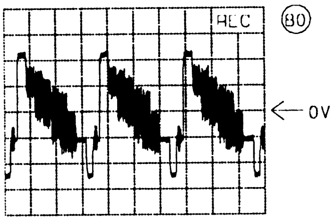
A: DC, 200mV/Div, 10us/Div
Transistor 7725 Emitter



A: AC, 500mV/Div, 500us/Div
Resistor 3605

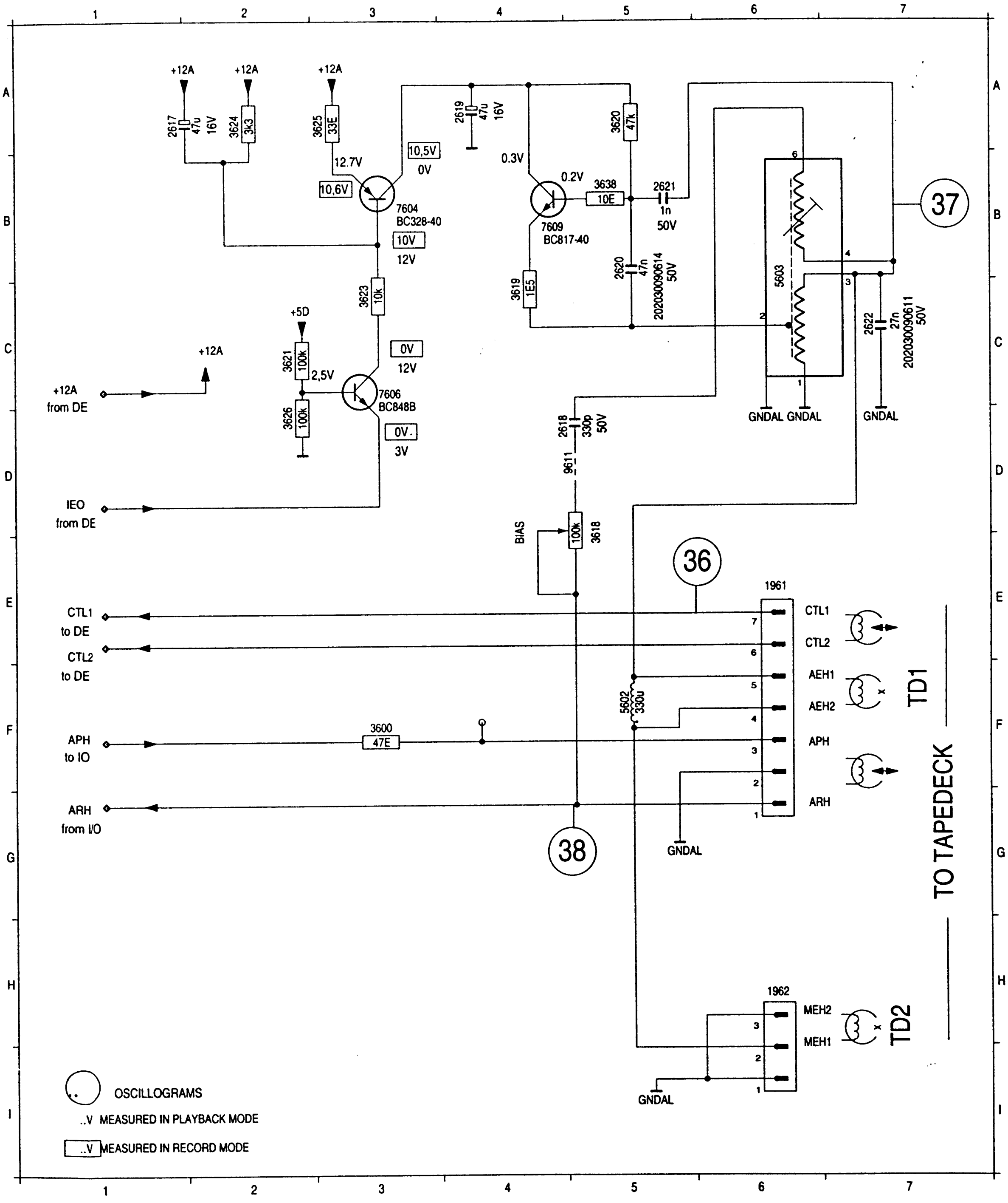


A: AC, 200mV/Div, 20us/Div
Transistor 7500 Basis



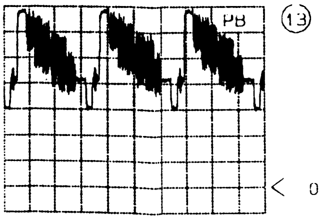
A: AC, 200mV/Div, 20us/Div
Transistor 7500 Basis

Mother Board PMB - Audio Linear (AL)

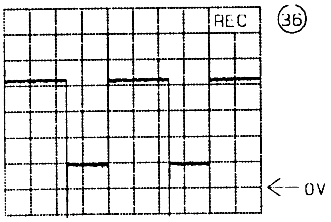

1
2
3
4
5
6
7
A
B
C
D
E
F
G
H
I
+12A
+12A
+12A
2617
47u
16V
3624
3k3
3625
33E
12.7V
10,6V
10,5V
0V
7604
BC328-40
10V
12V
3623
10k
2619
47u
16V
0.3V
0.2V
3638
10E
2621
1n
50V
7609
BC817-40
3620
47k
2620
47n
50V
2020300906144
3619
1E5
+5D
3621
100k
2,5V
3626
100k
7606
BC848B
0V
12V
0V.
3V
+12A
+12A
from DE
IEO
from DE
5603
6
4
3
2
1
GNDAL
GNDAL
2622
27n
50V
202030090611
GNDAL
37
2618
330p
50V
9611
BIAS
3618
100k
36
1961
CTL1
to DE
CTL2
to DE
APH
to IO
ARH
from I/O
3600
47E
5602
330u
7
6
5
4
3
2
1
CTL1
CTL2
AEH1
AEH2
APH
ARH
TD1
TO TAPEDECK
38
GNDAL
1962
MEH2
MEH1
3
2
1
TD2
GNDAL
OSCILLOGRAMS
..V MEASURED IN PLAYBACK MODE
..V MEASURED IN RECORD MODE

1961	E 6
1962	H 6
2617	A 1
2618	D 5
2619	A 4
2620	B 5
2621	B 5
2622	C 7
3600	F 3
3618	D 5
3619	C 4
3620	A 5
3621	C 2
3623	C 3
3624	A 2
3625	A 3
3626	D 2
3638	B 5
5602	F 5
5603	C 6
7604	B 3
7606	C 3
7609	B 5
9603	F 4
9611	D 5

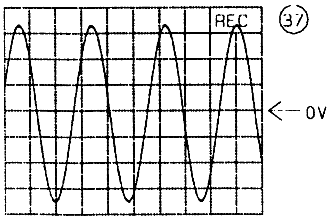
AL(40250)



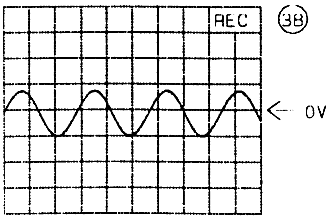
A: DC. 500mV/Div. 20us/Div
Resistor 3546



A: DC. 1 V/Div. 10ms/Div
Connector 1961 Pin 7



A: AC. 10 V/Div. 5us/Div
Capacitor 2621

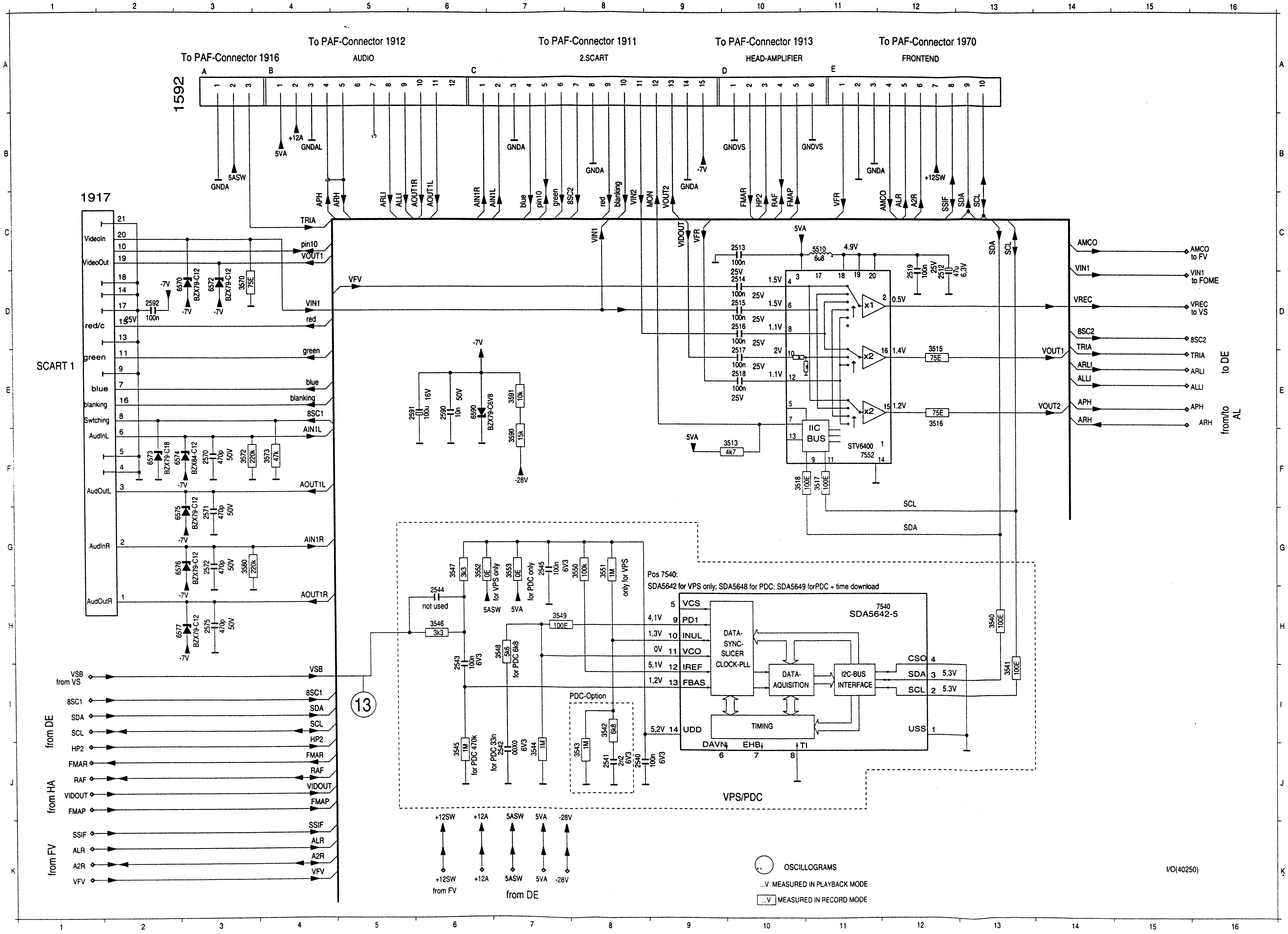


A: AC. 20 V/Div. 5us/Div
Connector 1961 Pin 1

Interconnections:

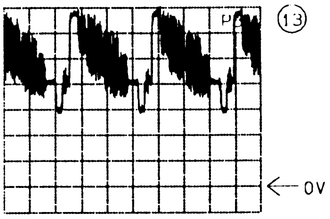
AF page 3-23	AL page 3-20	DC page 3-25	DE page 3-16	FV page 3-19	HA page 3-15
IO page 3-20	OS page 3-21	PS page 3-11	SD page 3-22	SE page 3-18	VS page 3-17

Mother Board PMB - In / Out (IO)


To PAF-Connector 1916
To PAF-Connector 1912
AUDIO
To PAF-Connector 1911
2.SCART
To PAF-Connector 1913
HEAD-AMPLIFIER
To PAF-Connector 1970
FRONTEND
1592
A
B
C
D
E
GNDA
5ASW
5VA
+12A
GNDAL
APH
ARH
ARLI
ALLI
AOUT1R
AOUT1L
AIN1R
AIN1L
blue
pin10
green
8SC2
red
blanking
VIN2
MON
VOUT2
-7V
GNDVS
FMAR
HP2
RAF
FMAP
VFR
AMCO
ALR
A2R
+12SW
SSIF
SDA
SCL
1917
SCART 1
VideoIn
VideoOut
red/c
green
blue
blanking
Swtching
AudInL
AudOutL
AudInR
AudOutR
TRIA
VOUT1
VFV
VIN1
VIDOUT
5VA
5510
6u8
4.9V
2513
100n
STV6400
7552
IIC
BUS
x1
x2
0.5V
1.4V
1.2V
3515
75E
3516
3513
4k7
3518
100E
3517
100E
VREC
8SC2
VOUT1
VOUT2
AMCO
to FV
VIN1
to FOME
VREC
to VS
to DE
from/to
AL
-28V
3591
10k
3590
15k
6590
BZX79-C6V8
2591
100u 16V
2590
10n 50V
6570
BZX79-C12
6572
BZX79-C12
3570
75E
2592
100n
6573
BZX79-C18
6574
BZX84-C12
2570
470p 50V
3572
220k
3573
47k
6575
BZX79-C12
2571
6576
2572
3580
220k
6577
2575
VSB
from VS
8SC1
SDA
SCL
HP2
FMAR
RAF
VIDOUT
FMAP
SSIF
ALR
A2R
VFV
from DE
from HA
from FV
13
Pos 7540:
SDA5642 for VPS only; SDA5648 for PDC; SDA5649 forPDC + time download
7540
SDA5642-5
VCS
PD1
INUL
VCO
IREF
FBAS
UDD
DATA-SYNC-SLICER CLOCK-PLL
DATA-AQUISITION
I2C-BUS INTERFACE
TIMING
CSO
USS
DAVN
EHB
TI
4,1V
1,3V
0V
5,1V
1,2V
5,2V
5,3V
2544
not used
3546
3k3
3547
3k3
3552
0E
for VPS only
3553
0E
for PDC only
2545
100n 6V3
3550
100k
3551
1M
only for VPS
3549
100E
3548
5k6
for PDC 6k8
2543
100n 6V3
3545
1M
for PDC 470k
2542
00X0
for PDC 33n
3544
1M
PDC-Option
3543
1M
3542
6k8
2541
2n2 6V3
2540
100n 6V3
3540
100E
3541
100E
VPS/PDC
+12SW
+12A
5ASW
5VA
-28V
from FV
from DE
OSCILLOGRAMS
...V MEASURED IN PLAYBACK MODE
...V MEASURED IN RECORD MODE
I/O(40250)

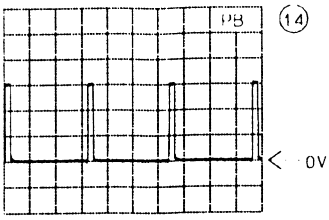
1592	B 3
1917	C 1
2512	D12
2513	C10
2514	D10
2515	D10
2516	D10
2517	E10
2518	E10
2519	D12
2540	J 8
2541	J 8
2542	J 7
2543	I 6
2544	H 6
2545	G 7
2570	F 3
2571	G 3
2572	G 3
2575	H 3
2590	E 6
2591	E 6
2592	D 2
3513	F10
3515	E12
3516	E12
3517	F11
3518	F10
3540	H13
3541	I13
3542	I 8
3543	J 8
3544	J 7
3545	J 6
3546	H 6
3547	G 6
3548	H 7
3549	H 7
3550	G 8
3551	G 8
3552	G 6
3553	G 7
3570	D 3
3572	F 3
3573	F 4
3580	G 3
3590	F 7
3591	E 7
5510	C11
6570	D 3
6572	D 3
6573	F 2
6574	F 3
6575	G 3
6576	G 3
6577	H 3
6590	E 6
7540	H11
7552	F11
9604	B 4
9608	B 5
9610	B 4

Oscillograms OS



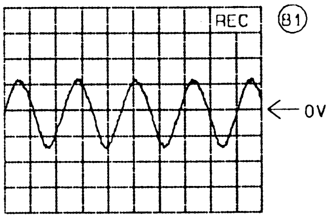
⑬

A: DC. 500mV/Div. 20us/Div
Resistor 3873



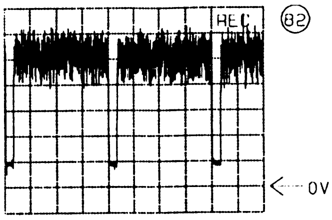
⑭

A: DC. 1 V/Div. 20us/Div
IC 7051 Pin 14



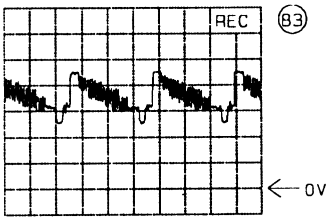
(81)

A: AC. 1 V/Div. 100ns/Div
Transistor 7830 Basis



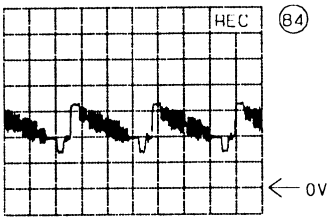
(82)

A: DC. 500mV/Div. 5ms/Div
Capacitor 2851



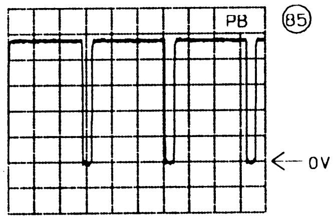
(83)

A: DC. 500mV/Div. 20us/Div
Capacitor 2850



(84)

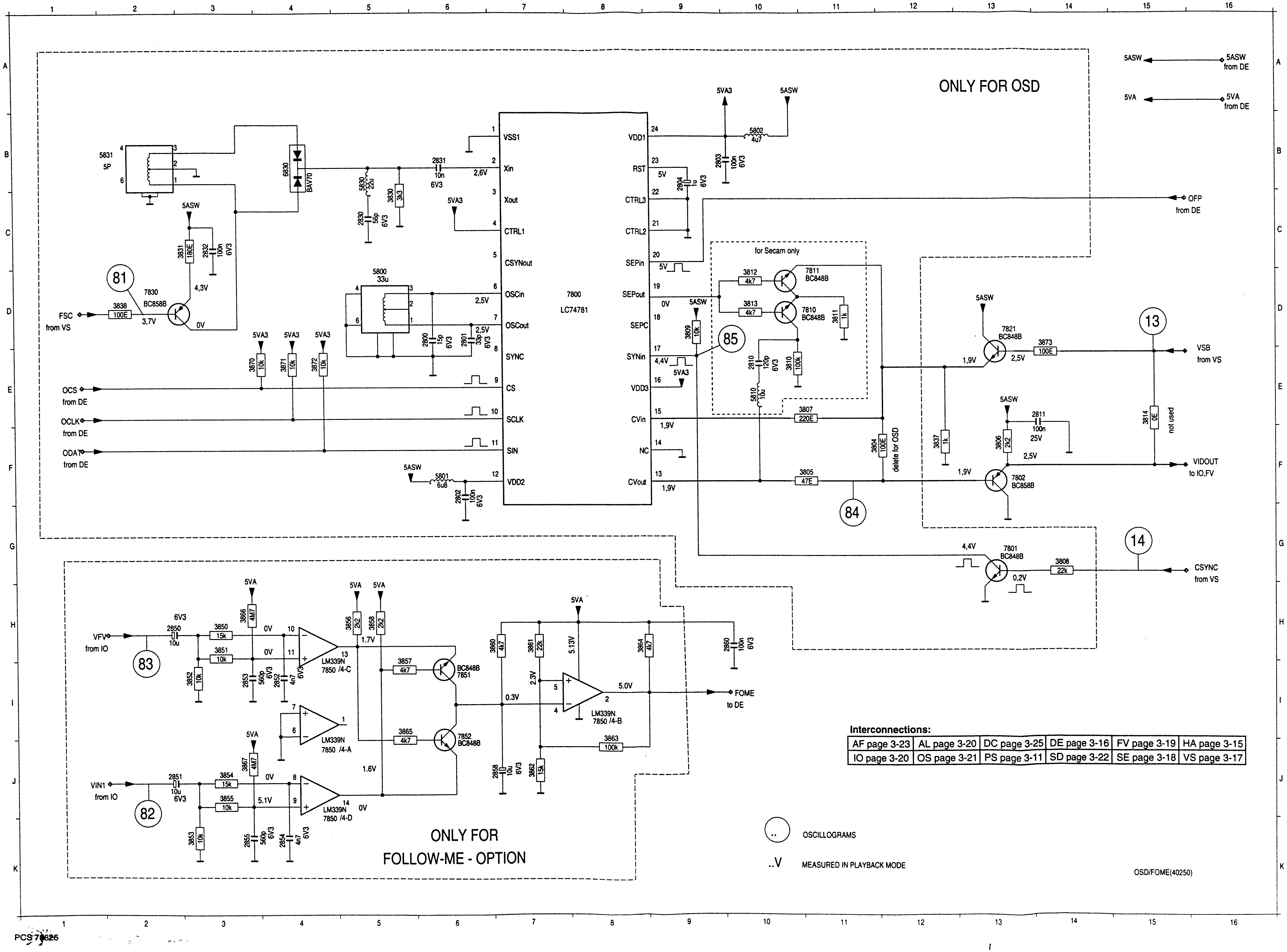
A: DC. 1 V/Div. 20us/Div
Transistor 7802



(85)

A: DC. 1 V/Div. 20us/Div
IC 7800 Pin 17

Mother Board PMB - Follow-me - On Screen Display (OS)

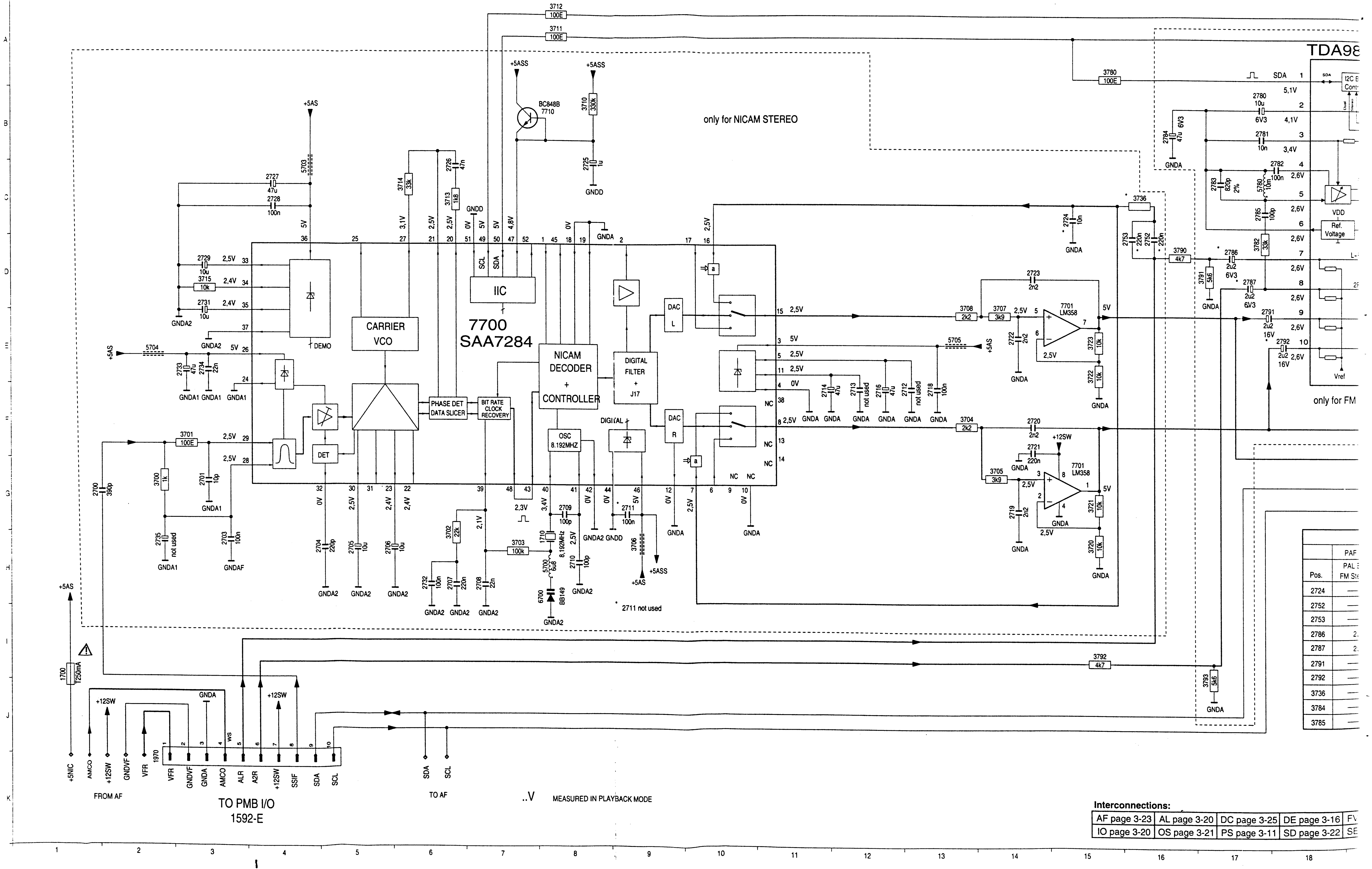

ONLY FOR OSD
7800
LC74781
VSS1
Xin
Xout
CTRL1
CSYNout
OSCin
OSCout
SYNC
CS
SCLK
SIN
VDD2
VDD1
RST
CTRL3
CTRL2
SEPin
SEPout
SEPC
SYNin
VDD3
CVin
NC
CVout
5831
5P
6830
BAV70
5830
22u
3830
3k3
2830
56p
6V3
2831
10n
6V3
2,6V
5ASW
5VA3
3831
180E
2832
100n
6V3
4,3V
7830
BC858B
FSC
from VS
3838
100E
3,7V
0V
5800
33u
2,5V
2800
15p
2801
33p
3870
10k
3871
10k
3872
10k
OCS
from DE
OCLK
from DE
ODAT
from DE
5801
6u8
2802
100n
5802
4u7
2803
100n
2804
1u
5V
for Secam only
3812
4k7
7811
BC848B
3813
4k7
7810
BC848B
3811
1k
3809
10k
2810
120p
3810
100k
5810
10u
3807
220E
3805
47E
1,9V
4,4V
3804
100E
delete for OSD
3837
1k
7821
BC848B
3873
100E
VSB
from VS
3814
0E
not used
2811
100n
25V
3806
2k2
7802
BC858B
VIDOUT
to IO,FV
OFP
from DE
5ASW
from DE
5VA
from DE
7801
BC848B
3808
22k
0,2V
CSYNC
from VS
VFV
from IO
2850
10u
3850
15k
3851
10k
3852
10k
2853
560p
2852
4n7
3866
4M7
LM339N
7850 /4-C
3856
2k2
3858
2k2
1.7V
3857
4k7
BC848B
7851
3865
4k7
7852
BC848B
LM339N
7850 /4-A
VIN1
from IO
2851
10u
3854
15k
3855
10k
3853
10k
2855
560p
2854
4n7
3867
4M7
5.1V
LM339N
7850 /4-D
1.6V
3860
4k7
3861
22k
5.13V
2.3V
0.3V
LM339N
7850 /4-B
5.0V
3864
4k7
3863
100k
2858
10u
3862
15k
2860
100n
FOME
to DE
ONLY FOR
FOLLOW-ME - OPTION
81
82
83
84
85
13
14
OSCILLOGRAMS
..V
MEASURED IN PLAYBACK MODE
OSD/FOME(40250)

Interconnections:

AF page 3-23	AL page 3-20	DC page 3-25	DE page 3-16	FV page 3-19	HA page 3-15
IO page 3-20	OS page 3-21	PS page 3-11	SD page 3-22	SE page 3-18	VS page 3-17

2800	D 6
2801	D 6
2802	F 6
2803	B 9
2804	B 9
2810	E10
2811	E14
2830	C 5
2831	B 6
2832	C 3
2850	H 2
2851	J 2
2852	I 4
2853	I 3
2854	K 4
2855	K 3
2858	J 7
2860	H10
3804	F11
3805	F11
3806	F13
3807	E11
3808	G14
3809	D 9
3810	E10
3811	D11
3812	D10
3813	D10
3814	E15
3830	C 5
3831	C 3
3837	F12
3838	D 2
3850	H 3
3851	H 3
3852	I 3
3853	K 3
3854	J 3
3855	J 3
3856	H 5
3857	I 5
3858	H 5
3860	H 7
3861	H 7
3862	J 7
3863	J 8
3864	H 8
3865	I 5
3866	H 3
3867	J 3
3870	E 3
3871	E 4
3872	E 4
3873	D14
5800	D 5
5801	F 6
5802	B10
5810	E10
5830	B 5
5831	B 2
6830	B 4
7800	D 7
7801	G13
7802	F13
7810	D11
7811	C11
7821	D13
7830	D 2
7850	I 8
7850	J 4
7850	J 4
7850	I 4
7851	I 6
7852	J 6

Nicam- Stereo Decoder PAF (SD)

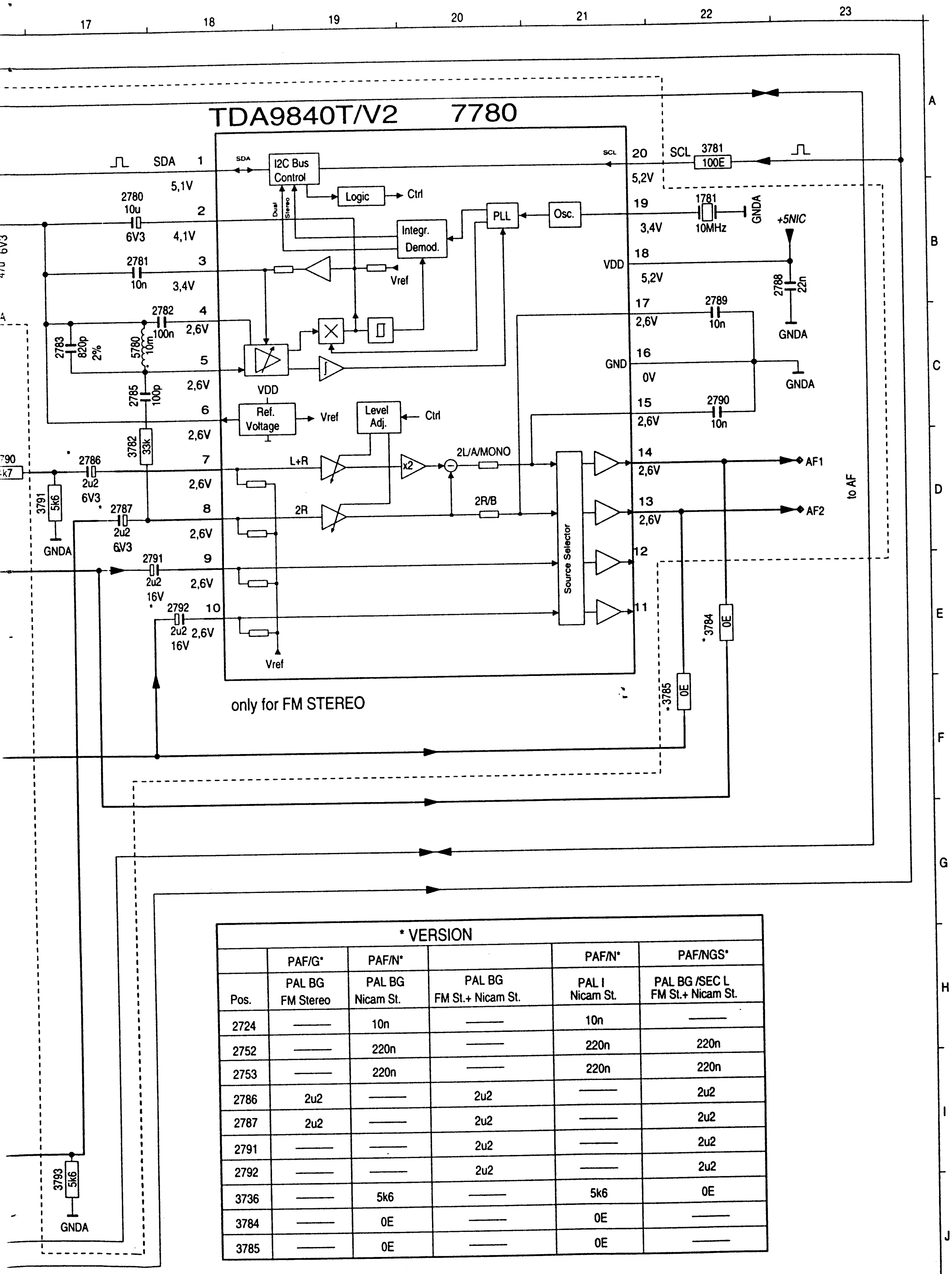

7700
SAA7284
IIC
SCL
SDA
CARRIER VCO
PHASE DET DATA SLICER
BIT RATE CLOCK RECOVERY
NICAM DECODER + CONTROLLER
DIGITAL FILTER + J17
OSC 8.192MHZ
DET
DEMO
DAC L
DAC R
DIGITAL
only for NICAM STEREO
BC848B 7710
+5ASS
+5AS
+5NIC
+12SW
GNDD
GNDA
GNDA1
GNDA2
GNDAF
3712 100E
3711 100E
3710 330k
2725 1u
3714 33k
3713 1k8
2726 47n
5703
2727 47u
2728 100n
2729 10u
3715 10k
2731 10u
5704
2733 47u
2734 22n
3701 100E
3700 1k
2701 10p
2700 390p
2735 not used
2703 100n
2704 220p
2705 10u
2706 10u
3702 22k
2732 100n
2707 220n
2708 22n
3703 100k
1710 8,192MHz
2709 100p
2710 100p
5700 6u8
6700 BB149
2711 100n
2711 not used
3706
5705
2714 47u
2713 not used
2716 47u
2712 not used
2718 100n
2724 10n
3736
2753 220n
2752 220n
3708 2k2
3707 3k9
2723 2n2
2722 2n2
7701 LM358
3723 10k
3722 10k
3704 2k2
2720 2n2
2721 220n
3705 3k9
2719 2n2
3721 10k
3720 10k
3780 100E
3790 4k7
3791 5k6
3792 4k7
3793 5k6
2780 10u 6V3
2781 10n
2782 10n
2783 820p 2%
5780 10m
2784 47u 6V3
2785 100p
3782 33k
2786 2u2 6V3
2787 2u2 6V3
2791 2u2 16V
2792 2u2 16V
TDA98
I2C B Contr
VDD
Ref. Voltage
Vref
only for FM
1700 T250mA
1970
VFR
GNDVF
GNDA
AMCO
ALR
A2R
+12SW
SSIF
SDA
SCL
WS
FROM AF
TO PMB I/O 1592-E
TO AF

..V MEASURED IN PLAYBACK MODE

Pos.	PAF
	PAL E FM St
2724	—
2752	—
2753	—
2786	2.
2787	2.
2791	—
2792	—
3736	—
3784	—
3785	—

Interconnections:

AF page 3-23	AL page 3-20	DC page 3-25	DE page 3-16	F
IO page 3-20	OS page 3-21	PS page 3-11	SD page 3-22	SE


17
18
19
20
21
22
23
TDA9840T/V2
7780
SDA
1
5,1V
2780
10u
6V3
2
4,1V
2781
10n
3
3,4V
2782
100n
4
2,6V
2783
820p
2%
5780
10m
5
2,6V
2785
100p
6
2,6V
3782
33k
2786
2u2
6V3
7
2,6V
3791
5k6
GNDA
2787
2u2
6V3
8
2,6V
2791
2u2
16V
9
2,6V
2792
2u2
16V
10
2,6V
I2C Bus Control
Logic
Ctrl
Dual
Stereo
Integr. Demod.
PLL
Osc.
Vref
VDD
Ref. Voltage
Level Adj.
L+R
2R
x2
2L/A/MONO
2R/B
Source Selector
SCL
20
5,2V
19
3,4V
18
VDD
5,2V
17
2,6V
16
GND
0V
15
2,6V
14
2,6V
13
2,6V
12
11
SCL
3781
100E
1781
10MHz
GNDA
+5NIC
2788
22n
GNDA
2789
10n
2790
10n
GNDA
AF1
AF2
to AF
3784
0E
3785
0E
only for FM STEREO
3793
5k6
GNDA
PAF/SD(40280)
A
B
C
D
E
F
G
H
I
J
K

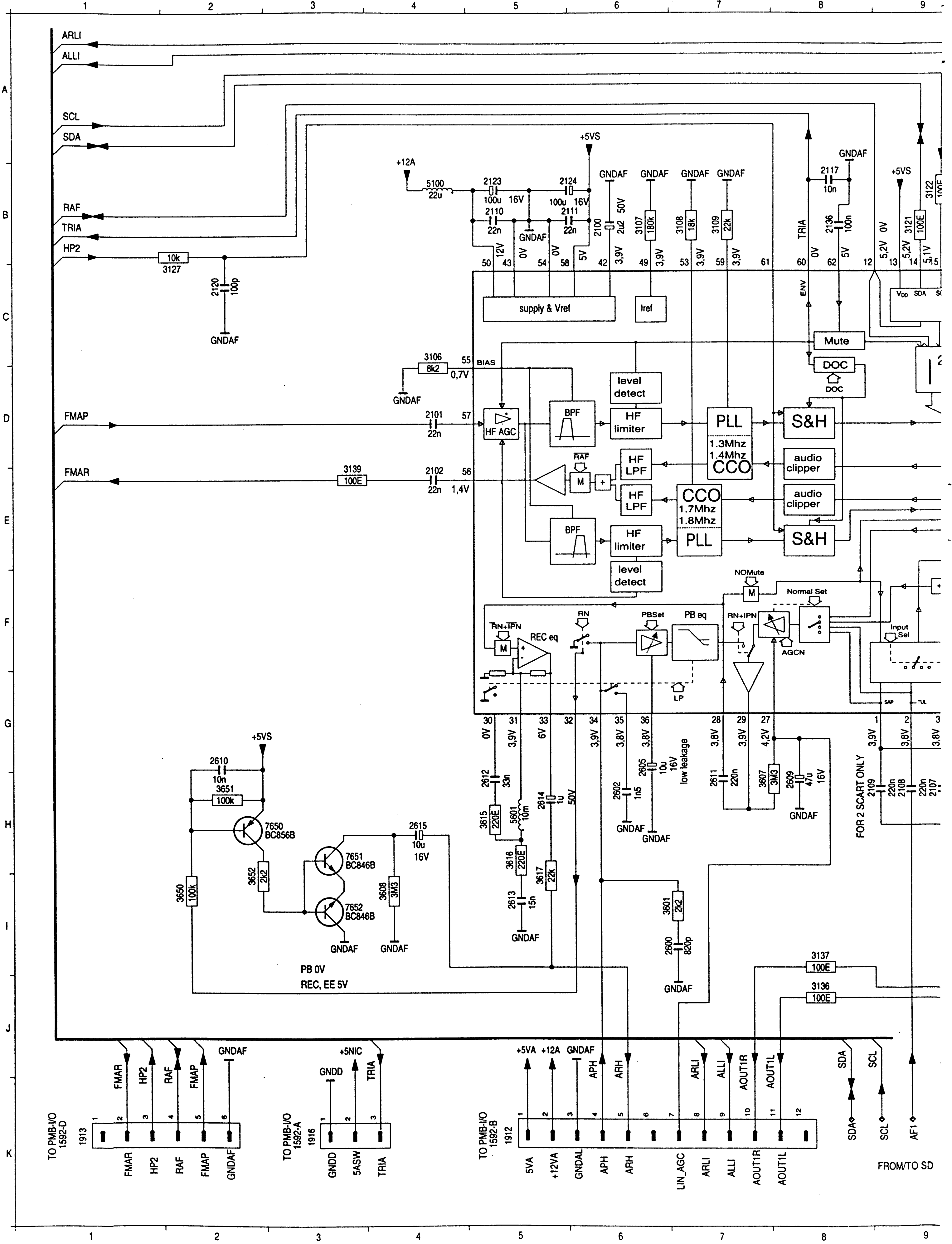
* VERSION

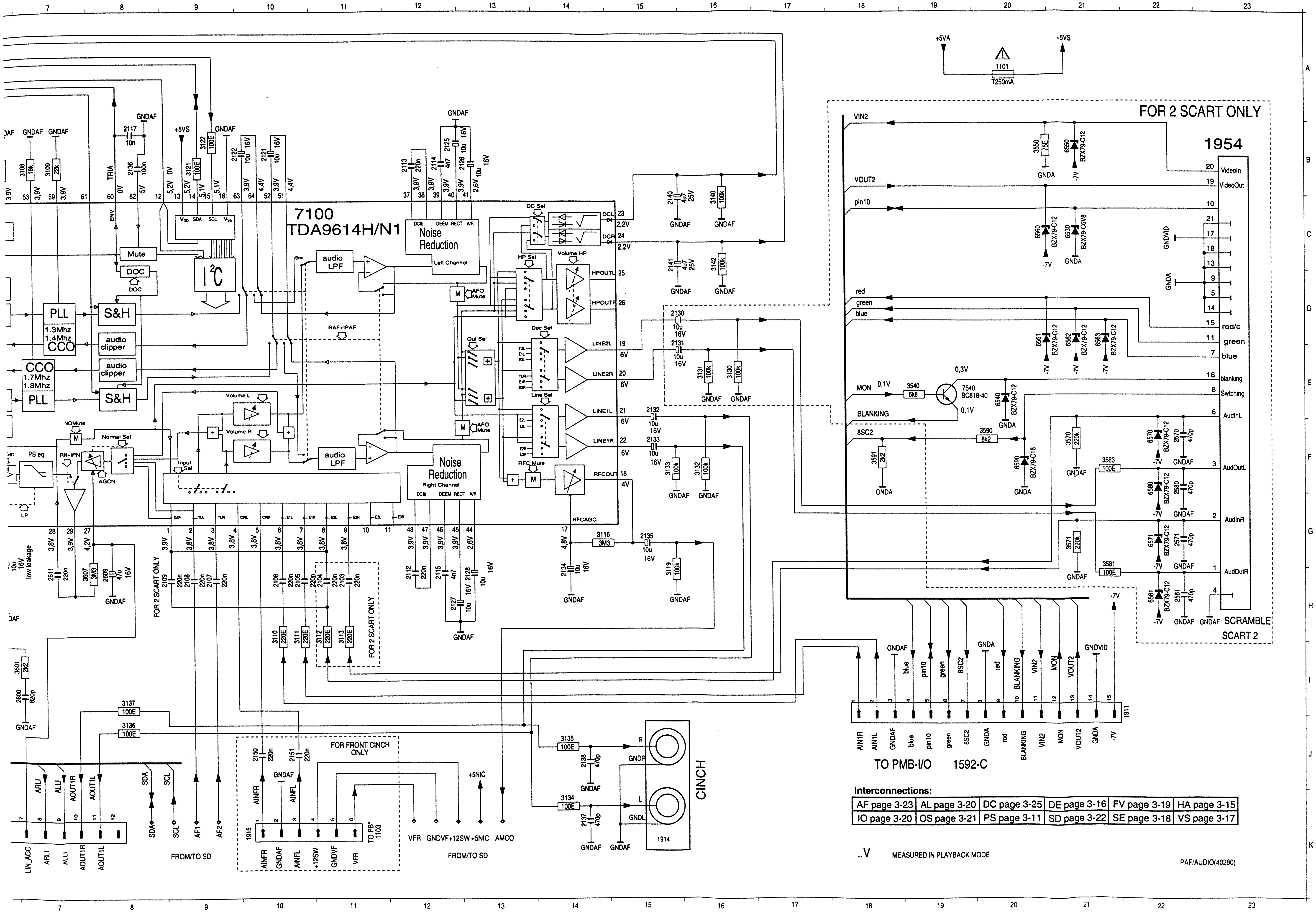
Pos.	PAF/G*	PAF/N*		PAF/N*	PAF/NGS*
	PAL BG FM Stereo	PAL BG Nicam St.	PAL BG FM St.+ Nicam St.	PAL I Nicam St.	PAL BG /SEC L FM St.+ Nicam St.
2724	———	10n	———	10n	———
2752	———	220n	———	220n	220n
2753	———	220n	———	220n	220n
2786	2u2	———	2u2	———	2u2
2787	2u2	———	2u2	———	2u2
2791	———	———	2u2	———	2u2
2792	———	———	2u2	———	2u2
3736	———	5k6	———	5k6	0E
3784	———	0E	———	0E	———
3785	———	0E	———	0E	———

1700	I 1
1710	H 8
1781	B22
1970	K 2
2700	G 1
2701	G 3
2703	H 3
2704	H 5
2705	H 5
2706	H 5
2707	H 6
2708	H 7
2709	G 8
2710	H 8
2711	G 9
2712	F13
2713	F12
2714	F11
2716	F12
2718	F13
2719	G14
2720	F14
2721	F14
2722	E14
2723	D14
2724	C15
2725	C 8
2726	C 6
2727	C 4
2728	C 4
2729	D 3
2731	D 3
2732	H 6
2733	E 3
2734	E 3
2735	H 2
2752	D16
2753	D16
2780	B17
2781	B17
2782	C18
2783	C17
2784	B16
2785	C17
2786	D17
2787	D17
2788	B23
2789	C22
2790	C22
2791	E17
2792	E18
3700	G 2
3701	F 3
3702	H 6
3703	H 7
3704	F13
3705	G14
3706	H 9
3707	D14
3708	D13
3710	B 8
3711	A 8
3712	A 8
3713	C 6
3714	C 6
3715	D 3
3720	H15
3721	G15
3722	E15
3723	E15
3736	C16
3780	A15
3781	A22
3782	D17
3784	E22
3785	F22
3790	D16
3791	D17
3792	I15
3793	I17
5700	H 8
5703	C 4
5704	E 2
5705	E13
5780	C17
6700	H 7
7700	E 7
7701	G15
7701	D15
7710	B 8
7780	A20

age 3-20	DC page 3-25	DE page 3-16	FV page 3-19	HA page 3-15
age 3-21	PS page 3-11	SD page 3-22	SE page 3-18	VS page 3-17

Audio Processing PAF (AF)


ARLI
ALLI
SCL
SDA
RAF
TRIA
HP2
FMAP
FMAR
10k
3127
2120
100p
GNDAF
+12A
5100
22u
2123
100u 16V
2124
100u 16V
2110
22n
2111
22n
+5VS
2100
2u2 50V
3107
180k
3108
18k
3109
22k
2117
10n
2136
100n
3121
100E
3122
supply & Vref
Iref
Mute
DOC
BIAS
3106
8k2
0,7V
level detect
HF AGC
BPF
HF limiter
PLL
S&H
1.3Mhz
1.4Mhz
CCO
HF LPF
audio clipper
CCO
1.7Mhz
1.8Mhz
2101
22n
3139
100E
2102
22n
1,4V
NOMute
Normal Set
Input Sel
RN+IPN
REC eq
RN
PBSet
PB eq
AGCN
LP
SAP
TUL
2610
10n
3651
100k
7650
BC856B
3652
2k2
3650
100k
7651
BC846B
7652
BC846B
2615
10u
16V
3608
3M3
PB 0V
REC, EE 5V
2612
33n
3615
220E
5601
10m
3616
220E
2613
15n
2614
1u
50V
3617
22k
2602
1n5
2605
10u
16V
low leakage
3601
2k2
2600
820p
2611
220n
3607
3M3
2609
47u
16V
FOR 2 SCART ONLY
2109
220n
2108
220n
2107
3137
100E
3136
100E
TO PMB-I/O
1592-D
1913
FMAR
HP2
RAF
FMAP
GNDAF
TO PMB-I/O
1592-A
1916
GNDD
5ASW
TRIA
+5NIC
TO PMB-I/O
1592-B
1912
5VA
+12VA
GNDAL
APH
ARH
LIN_AGC
ARLI
ALLI
AOUT1R
AOUT1L
+5VA
+12A
GNDAF
SDA
SCL
AF1
FROM/TO SD


7100
TDA9614H/N1
Noise Reduction
Left Channel
Noise Reduction
Right Channel
audio LPF
I²C
Mute
DOC
PLL
S&H
1.3Mhz
1.4Mhz
CCO
1.7Mhz
1.8Mhz
audio clipper
PB eq
NOMute
Normal Set
AGCN
Input Sel
Volume L
Volume R
RAF+IPAF
AFO Mute
DC Sel
HP Sel
Volume HP
Out Sel
Dec Sel
Line Sel
RFC Mute
HPOUTL
HPOUTR
LINE2L
LINE2R
LINE1L
LINE1R
RFCOUT
RFCAGC
+5VA
+5VS
1101
T250mA
FOR 2 SCART ONLY
1954
VideoIn
VideoOut
red/c
green
blue
blanking
Switching
AudInL
AudOutL
AudInR
AudOutR
SCRAMBLE
SCART 2
VIN2
VOUT2
pin10
MON
BLANKING
8SC2
7540
BC818-40
GNDAF
GNDA
GNDVID
FOR 2 SCART ONLY
FOR FRONT CINCH ONLY
CINCH
1914
1915
TO PB* 1103
AINFR
GNDAF
AINFL
+12SW
GNDVF
VFR
VFR GNDVF+12SW+5NIC AMCO
FROM/TO SD
LIN_AGC
ARLI
ALLI
AOUT1R
AOUT1L
SDA
SCL
AF1
AF2
FROM/TO SD
+5NIC
1911
AIN1R
AIN1L
GNDAF
blue
pin10
green
8SC2
GNDA
red
BLANKING
VIN2
MON
VOUT2
GNDA
-7V
TO PMB-I/O 1592-C

Interconnections:

AF page 3-23	AL page 3-20	DC page 3-25	DE page 3-16	FV page 3-19	HA page 3-15
IO page 3-20	OS page 3-21	PS page 3-11	SD page 3-22	SE page 3-18	VS page 3-17

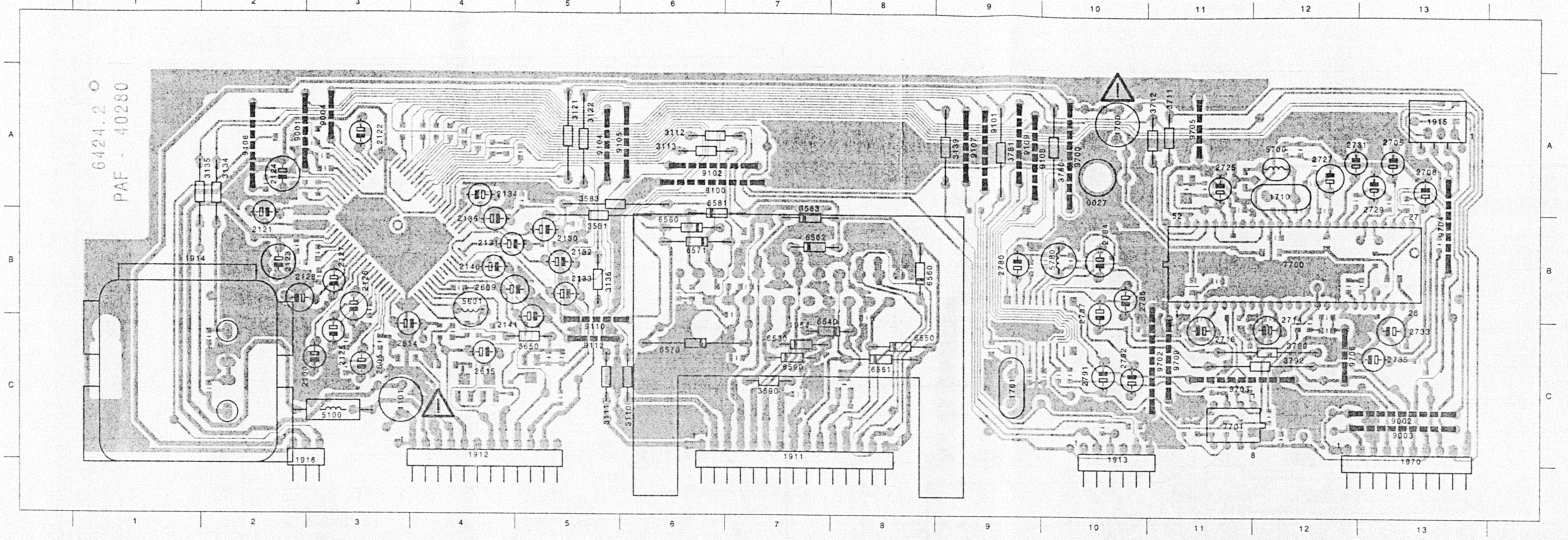
..V MEASURED IN PLAYBACK MODE

PAF/AUDIO(40280)

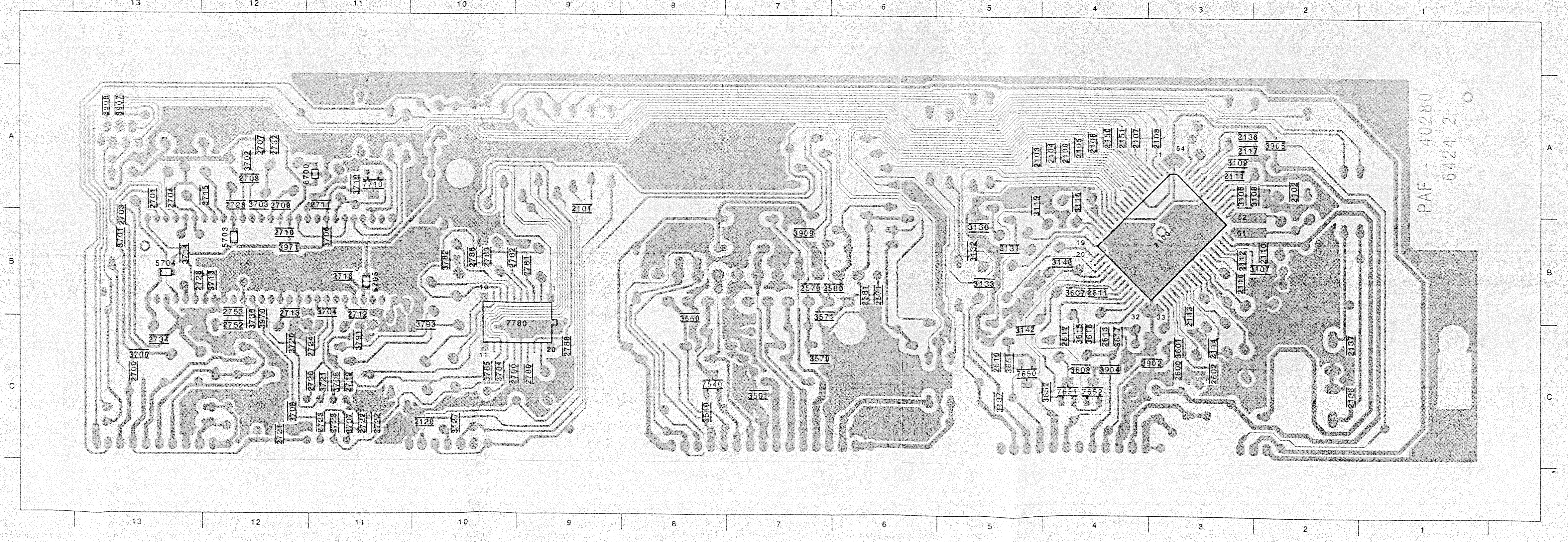
1101	A20
1911	I22
1912	K 5
1913	K 1
1914	K15
1915	K10
1916	K 3
1954	B23
2100	B 6
2101	D 4
2102	E 4
2103	H11
2104	H11
2105	H10
2106	H10
2107	H 9
2108	H 9
2109	H 9
2110	B 5
2111	B 6
2112	H12
2113	B12
2114	B12
2115	H12
2117	B 8
2120	C 2
2121	B10
2122	B10
2123	B 5
2124	B 6
2125	B12
2126	B12
2127	H12
2128	H13
2130	D15
2131	E15
2132	E15
2133	F15
2134	H14
2135	G15
2136	B 8
2137	K14
2138	J14
2140	C15
2141	C15
2150	J10
2151	J10
2570	F22
2571	G22
2580	F22
2581	H22
2600	I 7
2602	H 6
2605	G 6
2609	H 8
2610	G 2
2611	H 7
2612	H 5
2613	I 5
2614	H 5
2615	H 4
3106	C 4
3107	B 6
3108	B 7
3109	B 7
3110	H10
3111	H10
3112	H11
3113	H11
3116	G14
3119	H15
3121	B 9
3122	B 9
3127	C 2
3130	E16
3131	E16
3132	F16
3133	F15
3134	K14
3135	J14
3136	J 8
3137	I 8
3139	E 3
3140	C16
3142	C16
3540	E19
3550	B20
3570	F21
3571	G21
3581	G21
3583	F21
3590	F20
3591	F18
3601	I 6
3607	H 7
3608	I 4
3615	H 5
3616	H 5
3617	I 5
3650	I 2
3651	H 2
3652	I 2
5100	B 4
5601	H 5
6530	C21
6540	E20
6550	B21
6560	C20
6561	D20
6562	D21
6563	D21
6570	F22
6571	G22
6580	F22
6581	H22
6590	F20
7100	C10
7540	E19
7650	H 2
7651	H 3
7652	I 3

Nicam- Stereo- Audio Processing PAF

1101 C 3	1912 C 4	1954 B 7	2123 B 2	2128 B 2	2134 A 4	2609 B 5	2714 C 12	2731 A 12	2786 B 10	3111 C 5	3134 A 2	3583 A 5	3780 A 10	5601 B 4	6550 C 8	6570 C 6	7700 B 12	9004 A 3	9105 A 6	9110 C 5	9704 B 13
1700 A 10	1913 C 11	1970 C 13	2124 A 2	2130 B 5	2135 B 4	2614 C 3	2716 C 11	2733 C 13	2787 B 10	3112 A 6	3135 A 1	3590 C 7	3781 A 9	5700 A 12	6560 B 8	6571 B 6	7701 C 11	9100 A 6	9106 A 2	9112 C 5	9705 A 11
1710 A 12	1914 C 2	2100 C 3	2125 C 3	2131 B 4	2140 B 4	2615 C 4	2725 A 11	2735 C 13	2791 C 10	3113 A 6	3136 B 5	3650 C 5	3790 C 12	5780 B 10	6561 C 8	6580 B 6	9001 A 2	9101 A 9	9107 A 9	9700 A 10	9706 C 12
1781 C 9	1915 A 13	2121 B 2	2126 B 3	2132 B 5	2141 C 5	2705 A 13	2727 A 12	2780 B 9	2792 C 10	3121 A 5	3139 A 9	3711 A 11	3792 C 12	6530 C 7	6562 B 7	6581 B 6	9002 C 13	9102 A 6	9108 A 9	9702 C 11	9709 C 11
1911 C 7	1916 C 2	2122 A 3	2127 B 3	2133 B 5	2605 C 3	2706 A 13	2729 A 13	2784 B 10	3110 C 6	3122 A 5	3581 B 5	3712 A 11	5100 C 3	6540 C 7	6563 B 7	6590 C 7	9003 C 13	9104 A 5	9109 A 9	9703 C 11	

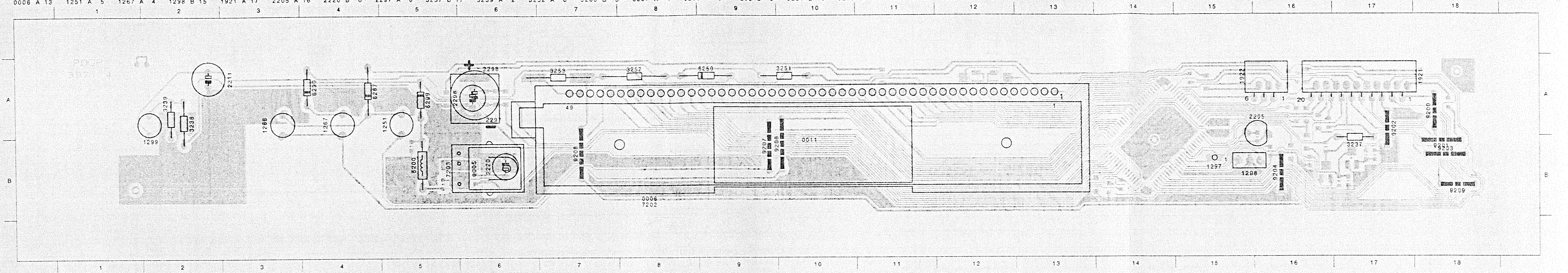


0027 A 10	2107 A 4	2114 C 3	2150 A 4	2602 C 3	2703 B 13	2712 B 11	2723 C 11	2753 B 12	2790 C 10	3127 C 10	3142 C 5	3607 B 4	3700 C 13	3707 C 11	3721 C 11	3791 C 11	3909 B 7	7100 B 3
2101 A 9	2108 A 3	2115 B 3	2151 A 4	2610 C 5	2704 A 13	2713 B 12	2724 C 11	2781 B 9	3106 A 3	3130 B 5	3540 C 8	3608 C 4	3701 B 13	3708 C 12	3722 C 11	3793 C 10	3970 C 12	7540 C 8
2102 A 2	2109 A 4	2117 A 3	2570 B 7	2611 B 4	2707 A 12	2718 B 11	2726 B 13	2782 B 10	3107 B 2	3131 B 5	3550 B 8	3615 C 4	3702 A 12	3710 A 11	3723 C 11	3902 C 3	3971 B 12	7650 C 5
2103 A 5	2110 B 2	2120 C 10	2571 B 6	2612 C 4	2708 A 12	2719 C 11	2728 A 12	2783 B 10	3108 A 2	3132 B 5	3570 C 7	3616 C 4	3703 A 12	3713 B 12	3736 C 12	3904 C 4	5703 B 12	7651 C 4
2104 A 4	2111 A 3	2136 A 3	2580 B 6	2613 C 4	2709 A 12	2720 C 11	2732 A 12	2785 B 10	3109 A 3	3133 B 5	3571 B 7	3617 C 4	3704 B 11	3714 B 13	3782 B 10	3905 A 2	5704 B 13	7652 C 4
2105 A 4	2112 B 3	2137 C 2	2581 B 6	2700 C 13	2710 B 12	2721 C 12	2734 C 13	2788 C 9	3116 A 4	3137 C 5	3591 C 7	3651 C 5	3705 C 11	3715 A 12	3784 C 10	3907 A 13	5705 B 11	7710 A 11
2106 A 4	2113 B 3	2138 C 2	2600 C 3	2701 A 13	2711 A 11	2722 C 11	2752 C 12	2789 C 9	3119 A 5	3140 B 4	3601 C 3	3652 C 4	3706 B 11	3720 C 12	3785 C 10	3908 A 13	6700 A 11	7780 C 9

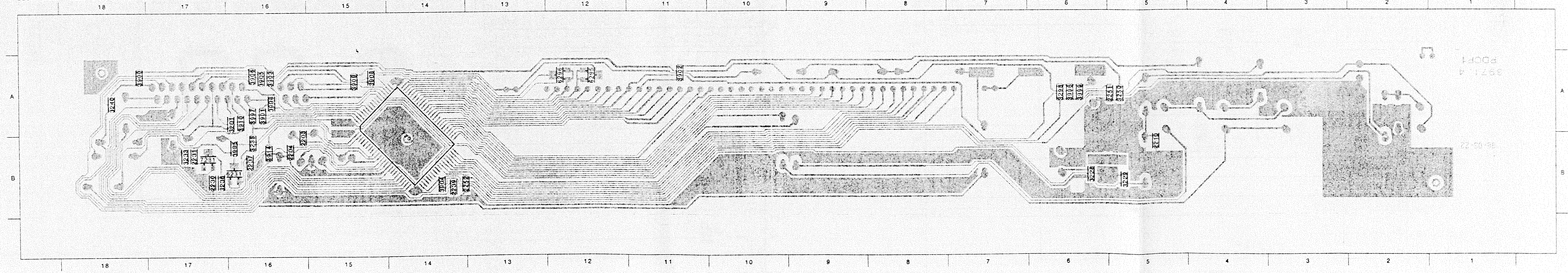


Operating Panel PDCP1 (DC)

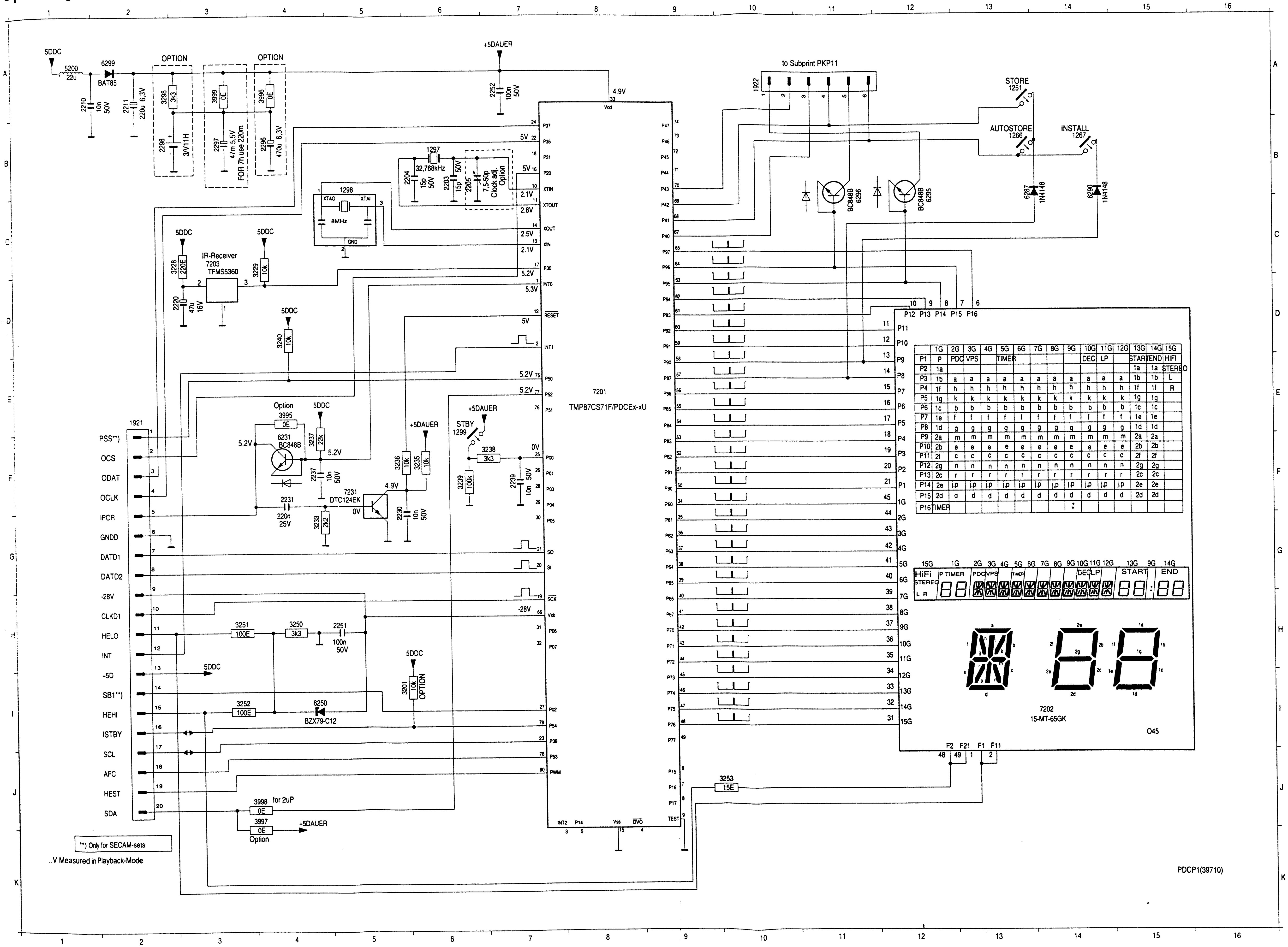
0005	B	6
0006	A	13
0011	B	10
1251	A	5
1266	A	3
1267	A	4
1297	B	15
1298	B	15
1299	A	2
1921	A	17
1922	A	16
2205	A	16
2211	A	2
2220	B	6
2296	A	6
2297	A	6
2298	A	6
3237	B	17
3238	A	2
3239	A	2
3251	A	10
3252	A	8
3253	A	7
5200	B	5
6250	A	9
6287	A	4
6290	A	4
6299	A	5
7202	A	10
7203	E	6
9200	A	18
9201	B	18
9202	A	17
9203	B	18
9204	B	16
9206	B	10
9207	B	9
9208	B	7
9209	B	18


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
A
B
1299
3239
3238
2211
1266
6290
1267
6287
1251
6299
2298
2296
5200
7203
0005
2220
3253
3252
6250
3251
49
1
9208
9207
9206
0011
0006
7202
1922
20
1921
2205
3202
9200
9201
9203
3237
1297
1298
6204
9209

2203	B	16
2204	B	16
2210	B	5
2230	B	17
2231	B	17
2237	B	16
2239	B	14
2251	A	5
2252	B	14
3201	A	16
3228	B	6
3229	B	5
3233	B	17
3235	B	16
3236	B	17
3240	A	18
3250	A	5
3299	A	6
3900	A	18
3901	A	16
3902	A	11
3903	A	16
3904	B	14
3905	A	16
3906	A	16
3908	A	15
3909	A	15
3910	A	16
3914	B	16
3995	B	16
3996	A	6
3997	A	16
3998	A	16
3999	A	6
6231	B	16
6295	A	12
6296	A	12
7201	B	14
7231	B	17


18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
A
B
3240
3900

Operating Panel PDCP1 (DC)


5DDC
5200
22u
6299
BAT85
2210
10n
50V
2211
220u 6,3V
OPTION
3298
3k3
2298
3V11H
3999
0E
2297
47m 5,5V
FOR 7h use 220m
OPTION
3996
0E
2296
470u 6,3V
+5DAUER
2252
100n
50V
4.9V
Vdd
to Subprint PKP11
1922
STORE
1251
AUTOSTORE
1266
INSTALL
1267
BC848B
6296
BC848B
6295
6287
1N4148
6290
1N4148
1297
32,768kHz
2204
15p
50V
2203
15p
50V
2205
7,5-50p
Clock adj.
Option
1298
XTAO
XTAI
8MHz
GND
5DDC
3228
220E
IR-Receiver
7203
TFMS5360
2220
47u
16V
3229
10k
3240
10k
7201
TMP87CS71F/PDCEx-xU
1921
PSS**)
OCS
ODAT
OCLK
IPOR
GNDD
DATD1
DATD2
-28V
CLKD1
HELO
INT
+5D
SB1**)
HEHI
ISTBY
SCL
AFC
HEST
SDA
Option
3995
0E
6231
BC848B
5.2V
3237
22k
2237
10n
50V
2231
220n
25V
7231
DTC124EK
3233
2k2
3236
10k
3235
10k
2230
10n
50V
STBY
1299
3238
3k3
3239
100k
2239
10n
50V
3251
100E
3250
3k3
2251
100n
50V
3201
10k
OPTION
3252
100E
6250
BZX79-C12
3998
0E
for 2uP
3997
0E
Option
+5DAUER
3253
15E
7202
15-MT-65GK
O45
F2 F21 F1 F11
HiFi
STEREO
P TIMER
PDC VPS
TIMER
DEC LP
START
END
PDCP1(39710)

**) Only for SECAM-sets

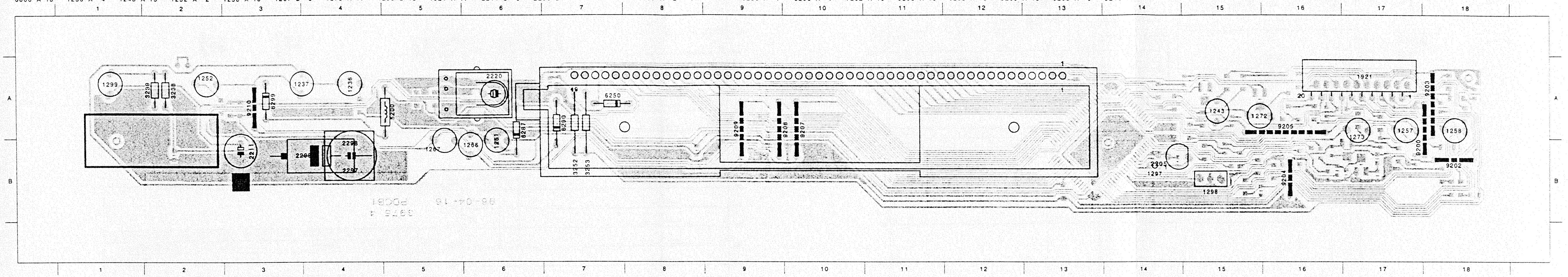
..V Measured in Playback-Mode

	1G	2G	3G	4G	5G	6G	7G	8G	9G	10G	11G	12G	13G	14G	15G
P1	P	PDC	VPS		TIMER					DEC	LP		START	END	HIFI
P2	1a												1a	1a	STEREO
P3	1b	a	a	a	a	a	a	a	a	a	a	a	1b	1b	L
P4	1f	h	h	h	h	h	h	h	h	h	h	h	1f	1f	R
P5	1g	k	k	k	k	k	k	k	k	k	k	k	1g	1g	
P6	1c	b	b	b	b	b	b	b	b	b	b	b	1c	1c	
P7	1e	f	f	f	f	f	f	f	f	f	f	f	1e	1e	
P8	1d	g	g	g	g	g	g	g	g	g	g	g	1d	1d	
P9	2a	m	m	m	m	m	m	m	m	m	m	m	2a	2a	
P10	2b	e	e	e	e	e	e	e	e	e	e	e	2b	2b	
P11	2f	c	c	c	c	c	c	c	c	c	c	c	2f	2f	
P12	2g	n	n	n	n	n	n	n	n	n	n	n	2g	2g	
P13	2c	r	r	r	r	r	r	r	r	r	r	r	2c	2c	
P14	2e	j,p	j,p	j,p	j,p	j,p	j,p	j,p	j,p	j,p	j,p	j,p	2e	2e	
P15	2d	d	d	d	d	d	d	d	d	d	d	d	2d	2d	
P16	TIMER								:						

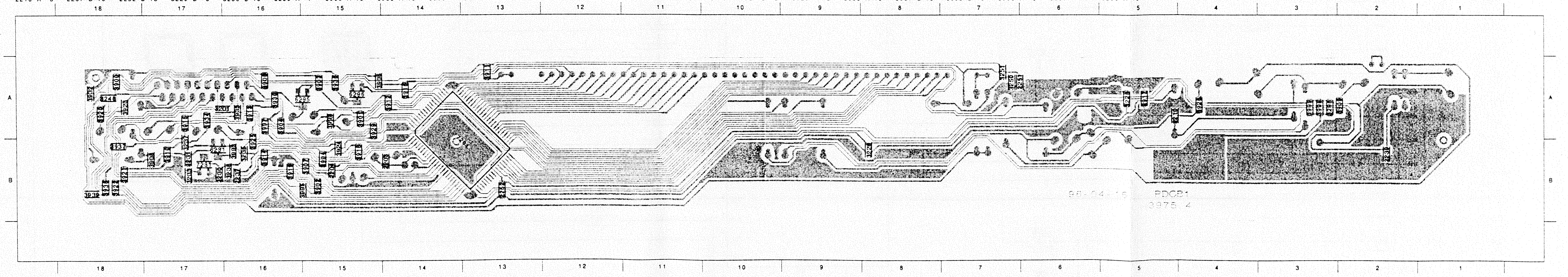
1251	A13
1266	B13
1267	B14
1297	B 6
1298	B 5
1299	E 6
1921	E 2
1922	A10
2203	B 6
2204	B 6
2205	B 6
2210	A 1
2211	A 2
2220	D 3
2230	F 5
2231	F 4
2237	F 4
2239	F 7
2251	H 5
2252	A 7
2296	B 4
2297	B 3
2298	B 2
3201	I 5
3228	C 3
3229	C 4
3233	G 4
3235	F 6
3236	F 5
3237	F 4
3238	F 7
3239	F 6
3240	D 4
3250	H 4
3251	H 3
3252	I 3
3253	J10
3298	A 2
3995	E 4
3996	A 4
3997	J 4
3998	J 4
3999	A 3
5200	A 1
6231	F 4
6250	I 4
6287	B13
6290	B14
6295	C12
6296	C11
6299	A 2
7201	E 8
7202	I14
7203	C 3
7231	F 5

Operating Panel PDCB1 (DC)

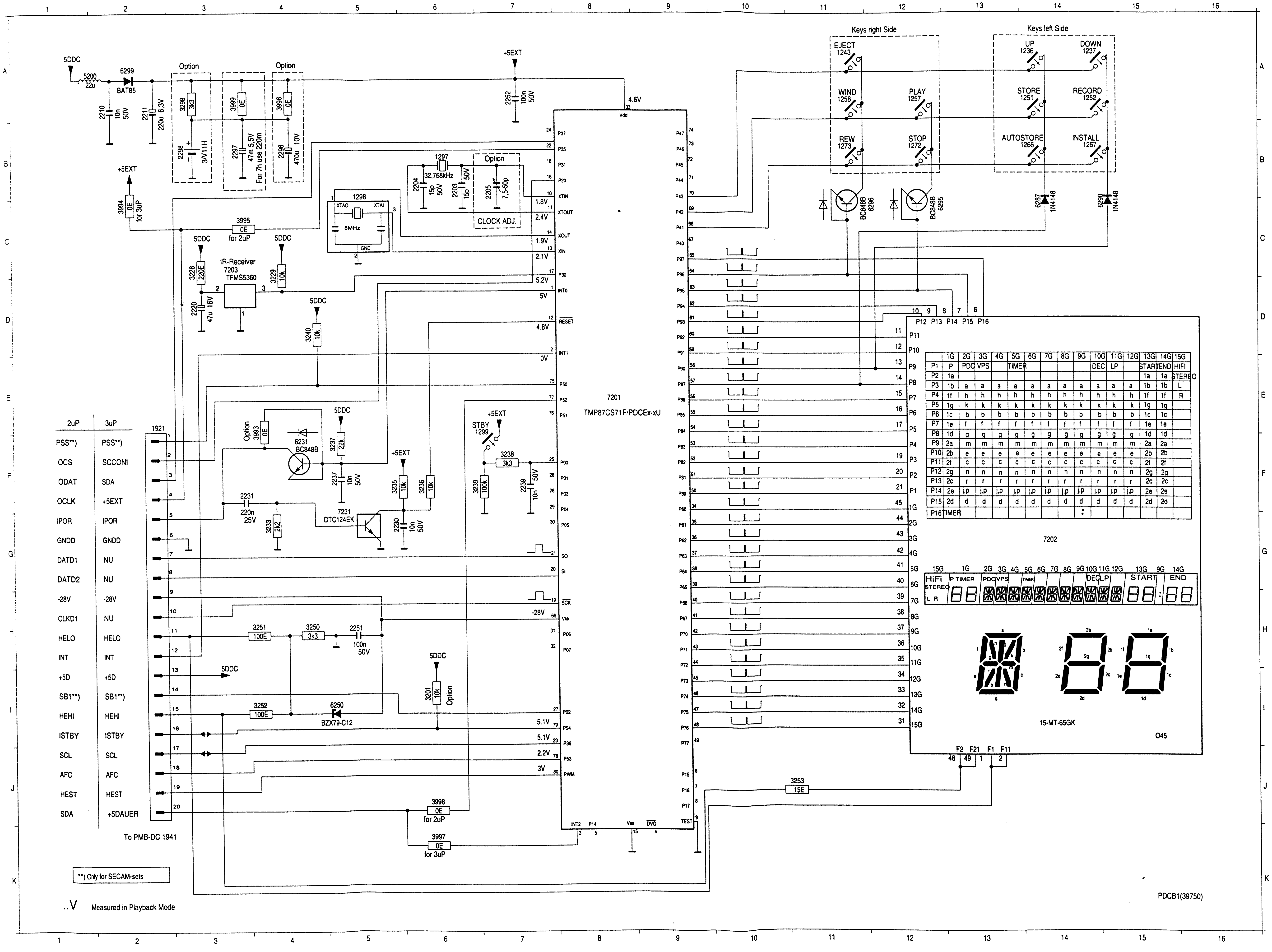
0005	A	6
0006	A	13
0011	A	10
1236	A	4
1237	A	3
1243	A	15
1251	B	6
1252	A	2
1257	A	17
1258	A	18
1266	B	6
1267	B	5
1272	A	15
1273	A	17
1297	B	14
1298	B	15
1299	A	1
1921	A	17
2205	B	14
2211	B	3
2220	A	6
2296	B	4
2297	B	4
2298	B	4
3238	A	2
3239	A	2
3252	A	7
3253	A	7
5200	A	5
6250	A	7
6287	A	6
6290	A	7
6299	A	3
7202	A	10
7203	A	5
9200	A	18
9202	B	18
9203	A	18
9204	B	16
9205	A	16
9207	A	10
9208	A	9
9209	A	9
9210	A	3


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
A
B
1299
3239
3238
1252
9210
6299
2211
2296
1237
1236
2298
2297
3200
2220
1267
1266
1251
6287
6250
6290
3252
3253
9200
9208
9207
1921
1243
1272
9205
1273
1257
1258
9203
9202
1297
1298
PDCB1
96-04-16
3975 4

2203	B	14
2204	B	15
2210	A	5
2230	B	17
2231	B	17
2237	B	16
2239	B	2
2251	A	6
2252	B	13
3201	A	16
3228	A	5
3229	B	8
3233	B	17
3235	B	16
3236	B	16
3237	B	17
3240	A	18
3250	A	7
3251	A	7
3298	A	3
3900	A	18
3901	A	15
3902	B	15
3903	A	15
3904	A	16
3905	A	15
3906	A	16
3907	B	15
3908	B	17
3909	A	2
3910	B	17
3911	A	13
3912	A	14
3913	A	16
3914	B	16
3915	A	17
3916	B	15
3917	A	5
3918	A	14
3919	B	16
3920	A	18
3921	B	18
3922	B	18
3923	A	18
3924	B	15
3925	B	16
3926	A	4
3929	A	15
3930	A	16
3932	A	18
3933	A	16
3934	A	17
3936	A	15
3937	B	18
3938	B	18
3939	B	18
3993	B	16
3994	B	15
3995	B	15
3996	A	3
3997	A	16
3998	A	15
3999	A	3
6231	B	17
6295	A	15
6296	A	15
7201	B	13
7231	B	17


18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
A
B
96-04-16
PDCB1
3975 4

Operating Panel PDCB1 (DC)


5DDC
5200
22u
6299
BAT85
2210
10n
50V
2211
220u 6,3V
Option
3298
3k3
2298
3V/11H
3999
0E
2297
47m 5,5V
For 7h use 220m
3996
0E
2296
470u 10V
+5EXT
2252
100n
50V
4.6V
Vdd
1297
32,768kHz
2204
15p
50V
2203
15p
50V
2205
7,5-50p
CLOCK ADJ.
1298
XTAO
XTAI
8MHz
GND
1.8V
2.4V
1.9V
2.1V
5.2V
5V
4.8V
0V
3994
0E
for 3uP
3995
0E
for 2uP
5DDC
3228
220E
IR-Receiver
7203
TFMS5360
3229
10k
2220
47u 16V
3240
10k
7201
TMP87CS71F/PDCEx-xU
P37
P35
P31
P20
XTIN
XTOUT
XOUT
XIN
P30
INT0
RESET
INT1
P50
P52
P51
P00
P01
P03
P04
P05
SO
SI
SCK
Vkk
P06
P07
P02
P54
P36
P53
PWM
INT2
P14
Vss
DVO
TEST
P47
P46
P45
P44
P43
P42
P41
P40
P97
P96
P95
P94
P93
P92
P91
P90
P87
P86
P85
P84
P83
P82
P81
P80
P60
P61
P62
P63
P64
P65
P66
P67
P70
P71
P72
P73
P74
P75
P76
P77
P15
P16
P17
Option
3993
0E
6231
BC848B
3237
22k
2237
10n
50V
2231
220n
25V
3233
2k2
7231
DTC124EK
3235
10k
3236
10k
2230
10n
50V
+5EXT
STBY
1299
3238
3k3
3239
100k
2239
10n
50V
-28V
3251
100E
3250
3k3
2251
100n
50V
5DDC
3201
10k
Option
3252
100E
6250
BZX79-C12
5.1V
5.1V
2.2V
3V
3998
0E
for 2uP
3997
0E
for 3uP
1921
To PMB-DC 1941
**) Only for SECAM-sets
..V Measured in Playback Mode
Keys right Side
EJECT
1243
WIND
1258
PLAY
1257
REW
1273
STOP
1272
Keys left Side
UP
1236
DOWN
1237
STORE
1251
RECORD
1252
AUTOSTORE
1266
INSTALL
1267
BC848B
6296
BC848B
6295
6287
1N4148
6290
1N4148
3253
15E
7202
P12 P13 P14 P15 P16
P11 P10 P9 P8 P7 P6 P5 P4 P3 P2 P1
1G 2G 3G 4G 5G 6G 7G 8G 9G 10G 11G 12G 13G 14G 15G
HiFi STEREO L R
P TIMER
PDC VPS
TIMER
DEC LP
START
END
15-MT-65GK
O45
F2 F21 F1 F11
PDCB1(39750)

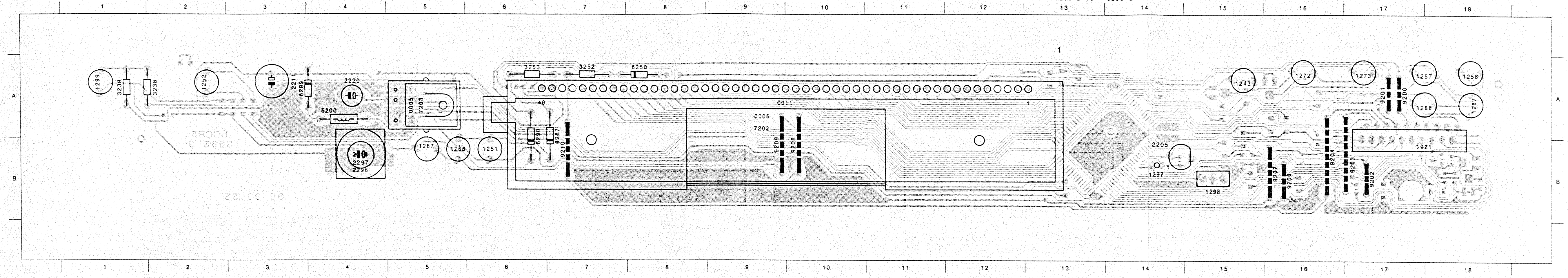
	2uP	3uP
1	PSS**)	PSS**)
2	OCS	SCCONI
3	ODAT	SDA
4	OCLK	+5EXT
5	IPOR	IPOR
6	GNDD	GNDD
7	DATD1	NU
8	DATD2	NU
9	-28V	-28V
10	CLKD1	NU
11	HELO	HELO
12	INT	INT
13	+5D	+5D
14	SB1**)	SB1**)
15	HEHI	HEHI
16	ISTBY	ISTBY
17	SCL	SCL
18	AFC	AFC
19	HEST	HEST
20	SDA	+5DAUER

	1G	2G	3G	4G	5G	6G	7G	8G	9G	10G	11G	12G	13G	14G	15G
P1	P	PDC	VPS		TIMER					DEC	LP		START	END	HIFI
P2	1a												1a	1a	STEREO
P3	1b	a	a	a	a	a	a	a	a	a	a	a	1b	1b	L
P4	1f	h	h	h	h	h	h	h	h	h	h	h	1f	1f	R
P5	1g	k	k	k	k	k	k	k	k	k	k	k	1g	1g	
P6	1c	b	b	b	b	b	b	b	b	b	b	b	1c	1c	
P7	1e	f	f	f	f	f	f	f	f	f	f	f	1e	1e	
P8	1d	g	g	g	g	g	g	g	g	g	g	g	1d	1d	
P9	2a	m	m	m	m	m	m	m	m	m	m	m	2a	2a	
P10	2b	e	e	e	e	e	e	e	e	e	e	e	2b	2b	
P11	2f	c	c	c	c	c	c	c	c	c	c	c	2f	2f	
P12	2g	n	n	n	n	n	n	n	n	n	n	n	2g	2g	
P13	2c	r	r	r	r	r	r	r	r	r	r	r	2c	2c	
P14	2e	j,p	j,p	j,p	j,p	j,p	j,p	j,p	j,p	j,p	j,p	j,p	2e	2e	
P15	2d	d	d	d	d	d	d	d	d	d	d	d	2d	2d	
P16	TIMER								:						

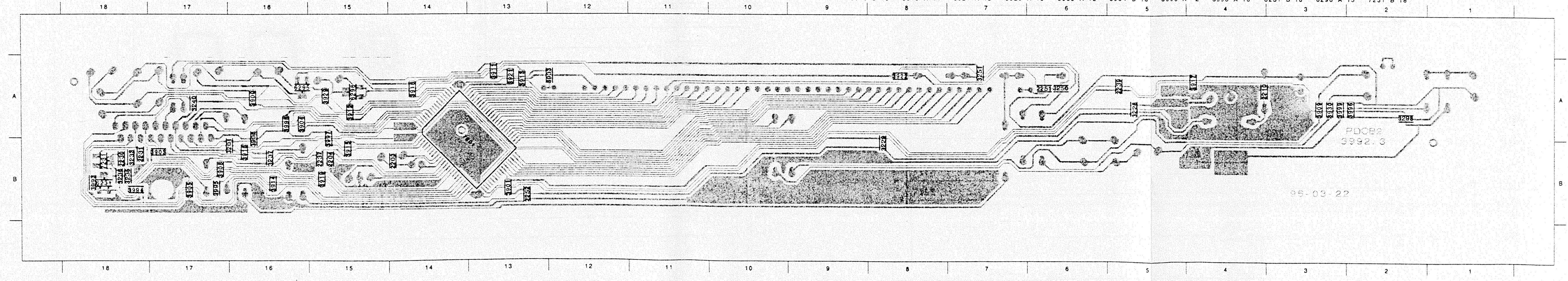
1236	A14
1237	A14
1243	A11
1251	A14
1252	A14
1257	A12
1258	A11
1266	B14
1267	B14
1272	B12
1273	B11
1297	B 6
1298	B 5
1299	F 7
1921	E 2
2203	B 6
2204	B 6
2205	B 7
2210	A 2
2211	A 2
2220	D 3
2230	G 5
2231	F 3
2237	F 5
2239	F 7
2251	H 5
2252	A 7
2296	B 4
2297	B 3
2298	B 3
3201	I 6
3228	C 3
3229	C 4
3233	G 4
3235	F 5
3236	F 6
3237	F 5
3238	F 7
3239	F 6
3240	D 4
3250	H 4
3251	H 4
3252	I 4
3253	J11
3298	A 3
3993	E 4
3994	C 2
3995	C 3
3996	A 4
3997	K 6
3998	J 6
3999	A 3
5200	A 2
6231	F 4
6250	I 5
6287	C14
6290	C15
6295	C12
6296	C12
6299	A 2
7201	E 8
7202	G14
7203	C 3
7231	G 5

Operating Panel PDCB2 (DC)

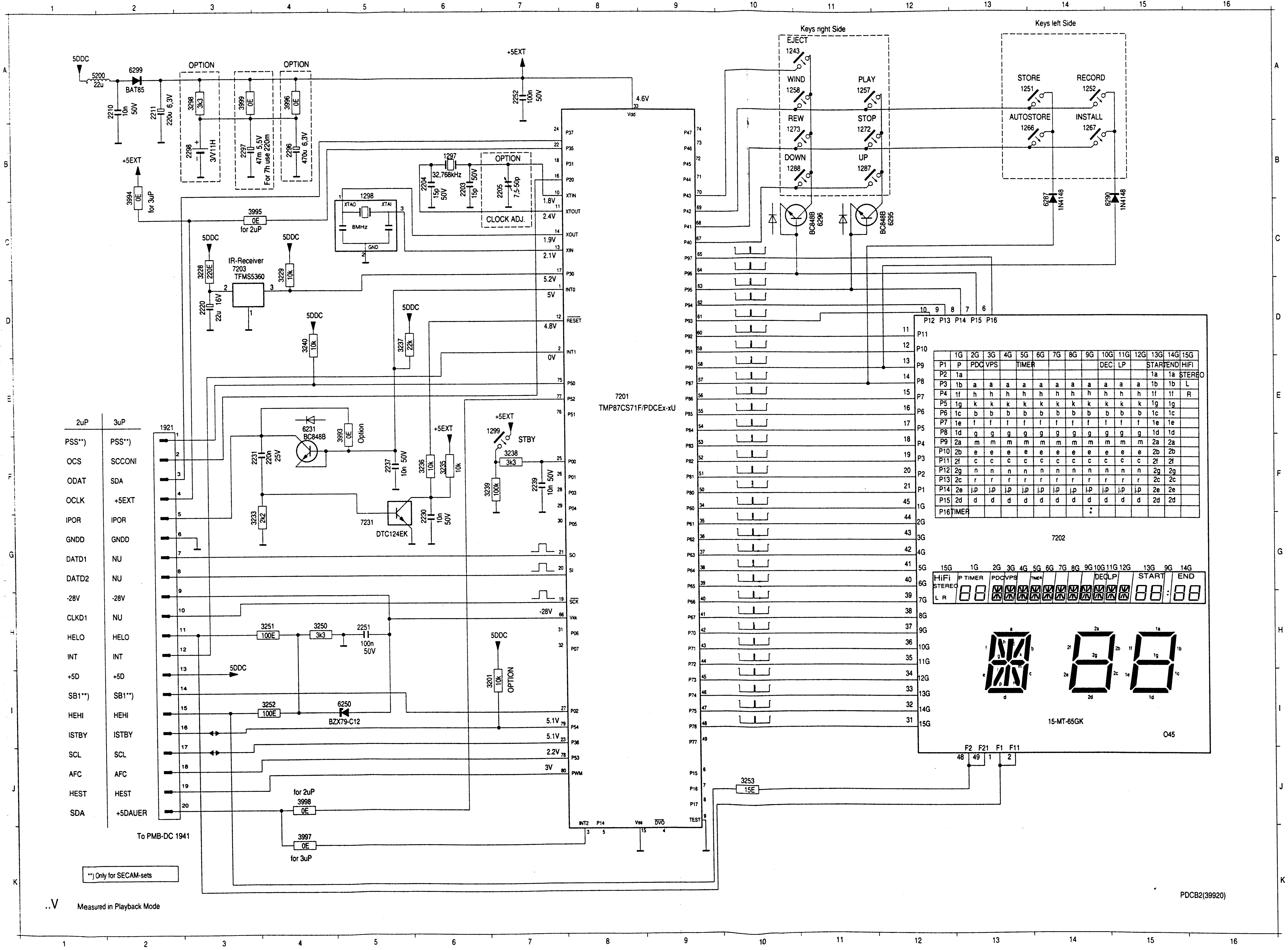
0005	A	5
0006	A	13
0011	B	9
1243	A	15
1251	B	6
1252	A	2
1257	A	17
1258	A	18
1266	B	5
1267	B	5
1272	A	16
1273	A	17
1287	A	18
1288	A	17
1297	B	14
1298	B	15
1299	A	1
1921	A	17
2205	B	14
2211	A	3
2220	A	4
2296	B	4
2297	B	4
2298	B	4
3238	A	2
3239	A	1
3252	A	7
3253	A	6
5200	A	4
6250	A	8
6287	A	7
6290	A	6
6299	A	4
7202	A	9
7203	A	5
9200	A	17
9201	A	17
9202	B	17
9203	B	17
9204	B	16
9206	B	16
9207	B	16
9208	B	10
9209	B	9
9210	B	7


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
A
B
1299
3239
3238
1252
2211
6299
2220
5200
0005
7203
2297
2296
1267
1266
1251
3253
3252
6250
48
0011
0006
7202
9209
9208
6290
6287
9210
1
1243
1272
1273
1257
1258
9201
9200
1288
1287
2205
1297
1298
1921
9207
9206
9204
9203
9202

2203	B	14
2204	B	15
2210	A	4
2230	B	18
2231	B	18
2237	B	15
2239	A	5
2251	A	6
2252	B	13
3201	B	16
3228	A	5
3229	B	8
3233	B	18
3235	B	18
3236	B	18
3237	B	16
3240	A	17
3250	A	6
3251	A	7
3298	A	2
3900	A	16
3901	B	13
3903	B	17
3904	A	16
3905	B	17
3906	B	16
3908	B	17
3909	A	3
3911	A	13
3912	A	15
3913	A	13
3914	B	16
3915	B	15
3916	B	16
3917	A	4
3918	A	14
3919	B	15
3921	A	13
3922	A	8
3929	A	15
3930	A	3
3933	A	12
3993	B	18
3994	B	18
3995	B	17
3996	A	2
3997	B	15
3998	A	16
3999	A	3
6231	B	18
6295	A	16
6296	A	15
7201	B	13
7231	B	18


18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
A
B
PDCB2
3992.3

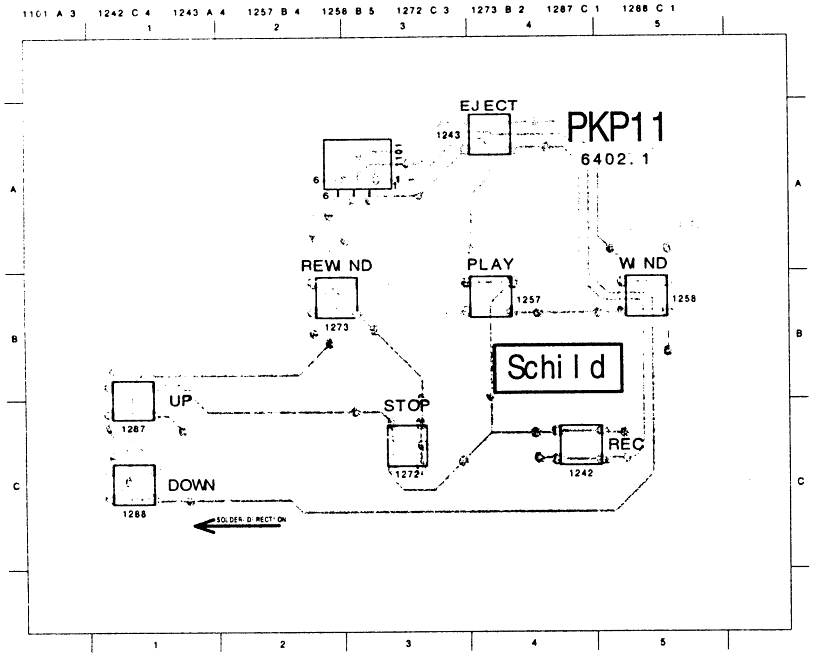
Operating Panel PDCB2 (DC)

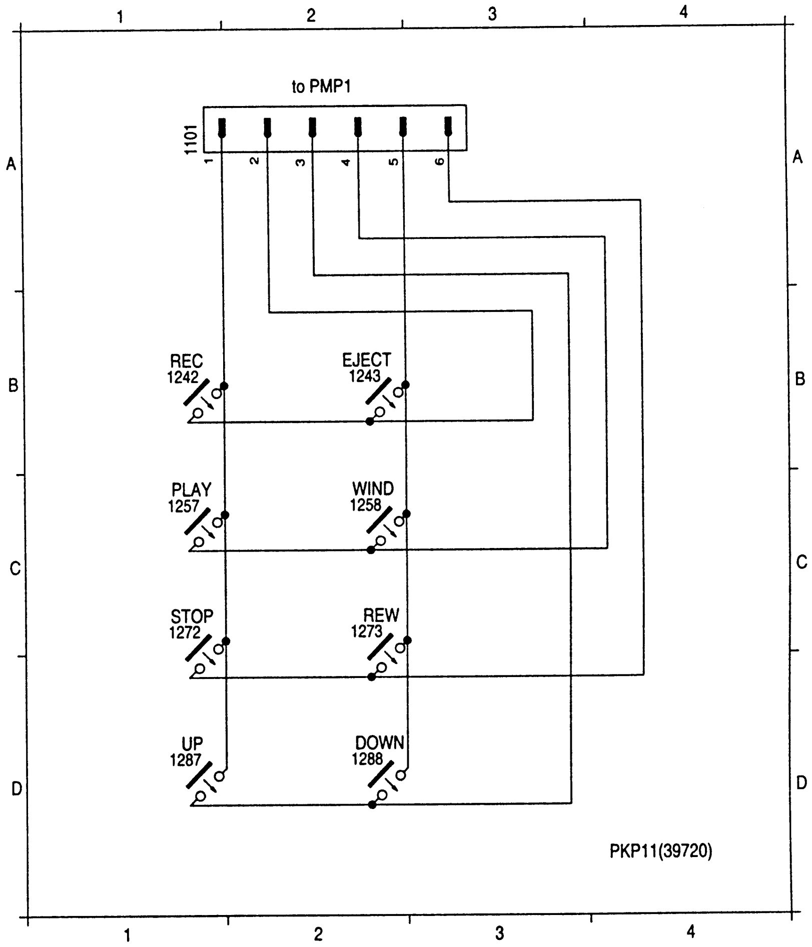

5DDC
5200
22u
6299
BAT85
2210
10n
50V
2211
220u 6,3V
OPTION
3298
3k3
2298
3V11H
3999
0E
2297
47m 5,5V
For 7h use 220m
OPTION
3996
0E
2296
470u 6,3V
+5EXT
2252
100n
50V
4.6V
Vdd
+5EXT
3994
0E
for 3uP
3995
0E
for 2uP
1297
32,768kHz
2204
15p
50V
2203
15p
50V
OPTION
2205
7,5-50p
CLOCK ADJ.
1298
XTAO
XTAI
8MHz
GND
5DDC
5DDC
3228
220E
IR-Receiver
7203
TFMS5360
3229
10k
2220
22u 16V
5DDC
3240
10k
5DDC
3237
22k
1.8V
2.4V
1.9V
2.1V
5.2V
5V
4.8V
0V
P37
P35
P31
P20
XTIN
XTOUT
XOUT
XIN
P30
INT0
RESET
INT1
P50
P52
P51
P00
P01
P03
P04
P05
SO
SI
SCK
Vkk
P06
P07
P02
P54
P36
P53
PWM
INT2
P14
Vss
DVO
TEST
P47
P46
P45
P44
P43
P42
P41
P40
P97
P96
P95
P94
P93
P92
P91
P90
P87
P86
P85
P84
P83
P82
P81
P80
P60
P61
P62
P63
P64
P65
P66
P67
P70
P71
P72
P73
P74
P75
P76
P77
P15
P16
P17
7201
TMP87CS71F/PDCEx-xU
6231
BC848B
3993
0E
Option
2231
220n
25V
2237
10n 50V
+5EXT
3236
10k
3235
10k
+5EXT
1299
STBY
3238
3k3
3239
100k
2239
10n 50V
3233
2k2
7231
DTC124EK
2230
10n
50V
-28V
3251
100E
3250
3k3
2251
100n
50V
5DDC
3201
10k
OPTION
5DDC
3252
100E
6250
BZX79-C12
5.1V
5.1V
2.2V
3V
for 2uP
3998
0E
3997
0E
for 3uP
3253
15E
1921
2uP
3uP
PSS**)
PSS**)
OCS
SCCONI
ODAT
SDA
OCLK
+5EXT
IPOR
IPOR
GNDD
GNDD
DATD1
NU
DATD2
NU
-28V
-28V
CLKD1
NU
HELO
HELO
INT
INT
+5D
+5D
SB1**)
SB1**)
HEHI
HEHI
ISTBY
ISTBY
SCL
SCL
AFC
AFC
HEST
HEST
SDA
+5DAUER
To PMB-DC 1941
**) Only for SECAM-sets
..V Measured in Playback Mode
Keys right Side
EJECT
1243
WIND
1258
PLAY
1257
REW
1273
STOP
1272
DOWN
1288
UP
1287
BC848B
6296
BC848B
6295
Keys left Side
STORE
1251
RECORD
1252
AUTOSTORE
1266
INSTALL
1267
6287
1N4148
6290
1N4148
P12 P13 P14 P15 P16
P11
P10
P9
P8
P7
P6
P5
P4
P3
P2
P1
1G
2G
3G
4G
5G
6G
7G
8G
9G
10G
11G
12G
13G
14G
15G
7202
15G 1G 2G 3G 4G 5G 6G 7G 8G 9G 10G 11G 12G 13G 9G 14G
HiFi
STEREO
L R
P TIMER
PDC VPS
TIMER
DEC LP
START
END
15-MT-65GK
045
F2 F21 F1 F11
PDCB2(39920)

	1G	2G	3G	4G	5G	6G	7G	8G	9G	10G	11G	12G	13G	14G	15G
P1	P	PDC	VPS		TIMER					DEC	LP		START	END	HIFI
P2	1a												1a	1a	STEREO
P3	1b	a	a	a	a	a	a	a	a	a	a	a	1b	1b	L
P4	1f	h	h	h	h	h	h	h	h	h	h	h	1f	1f	R
P5	1g	k	k	k	k	k	k	k	k	k	k	k	1g	1g	
P6	1c	b	b	b	b	b	b	b	b	b	b	b	1c	1c	
P7	1e	f	f	f	f	f	f	f	f	f	f	f	1e	1e	
P8	1d	g	g	g	g	g	g	g	g	g	g	g	1d	1d	
P9	2a	m	m	m	m	m	m	m	m	m	m	m	2a	2a	
P10	2b	e	e	e	e	e	e	e	e	e	e	e	2b	2b	
P11	2f	c	c	c	c	c	c	c	c	c	c	c	2f	2f	
P12	2g	n	n	n	n	n	n	n	n	n	n	n	2g	2g	
P13	2c	r	r	r	r	r	r	r	r	r	r	r	2c	2c	
P14	2e	j,p	j,p	j,p	j,p	j,p	j,p	j,p	j,p	j,p	j,p	j,p	2e	2e	
P15	2d	d	d	d	d	d	d	d	d	d	d	d	2d	2d	
P16	TIMER								:						

1243	A11
1251	A14
1252	A14
1257	A11
1258	A11
1266	B14
1267	B14
1272	B11
1273	B11
1287	B11
1288	B11
1297	B 6
1298	B 5
1299	E 7
1921	E 2
2203	B 6
2204	B 6
2205	B 7
2210	A 2
2211	A 2
2220	D 3
2230	G 6
2231	F 4
2237	F 5
2239	F 7
2251	H 5
2252	A 7
2296	B 4
2297	B 3
2298	B 3
3201	I 7
3228	C 3
3229	C 4
3233	G 3
3235	F 6
3236	F 6
3237	D 5
3238	F 7
3239	F 7
3240	D 4
3250	H 4
3251	H 4
3252	I 4
3253	J10
3298	A 3
3993	E 5
3994	B 2
3995	C 4
3996	A 4
3997	K 4
3998	J 4
3999	A 3
5200	A 2
6231	E 4
6250	I 5
6287	C14
6290	C15
6295	C12
6296	C11
6299	A 2
7201	E 8
7202	G14
7203	C 3
7231	G 5

Key Board PKP11


1101 A 3
1242 C 4
1243 A 4
1257 B 4
1258 B 5
1272 C 3
1273 B 2
1287 C 1
1288 C 1
PKP11
6402. 1
EJECT
1243
1101
6
1
REW ND
1273
PLAY
1257
W ND
1258
Schil d
UP
1287
STOP
1272
REC
1242
DOWN
1288
SOLDER DIRECTION
A
B
C
1
2
3
4
5


to PMP1
1101
1
2
3
4
5
6
REC
1242
EJECT
1243
PLAY
1257
WIND
1258
STOP
1272
REW
1273
UP
1287
DOWN
1288
PKP11(39720)
A
B
C
D
1
2
3
4

1101	A 1
1242	B 1
1243	B 2
1257	C 1
1258	C 2
1272	C 1
1273	C 2
1287	D 1
1288	D 2

4. DRIVE ASSEMBLY

This tape deck has three motors; one providing precision drive for the scanner unit; the second providing direct drive for the capstan and belt drive for the reel tables; the third motor drives the lift and tape threading/dethreading operations.

Special features are:

Quick start
Short winding time
Automatic cleaning of video heads by cleaning roller

To obtain a high repair standard we have developped a range of service kit's. These kit's covers the spare parts which are engaged together.
The tape deck's sensors are located on the motherboard underneath the tape deck, and included in its circuitry, lay out and parts list.

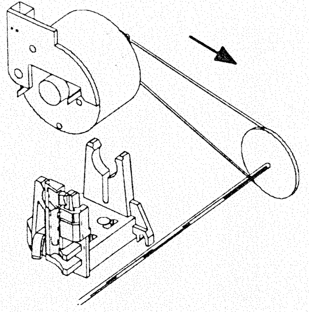
4.1 Deck parts replacement

The procedure for the removal and refitting of the following parts is described; only the lift, the scanner, the capstan motor and the A/C head are fixed by screws.
All the other deck assembly parts are held only by snap hooks.

For the replacement of parts on the underside of the tape deck, remove the tape deck from the motherboard.

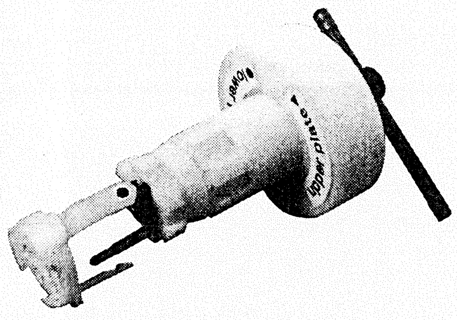
Manual extraction of cassette:
If, after the Eject button has been pressed, the drive does not unthread and eject the cassette, the dethreading/eject operation can also be carried out manually by turning the wheel at the rear of the threading motor.

fig. 1

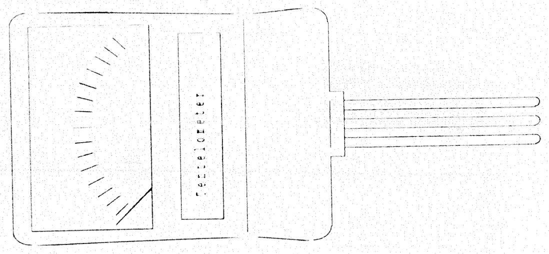


IMPORTANT:
After each repair has been carried out in the drive assembly, the first operation after repairing must be to bring the cassette compartment into „eject“ position by hand.

Auxiliary tools for deck adjustment:

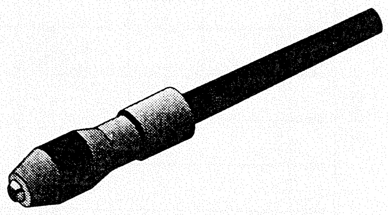


Tool for removing the head disc 4822 395 90977

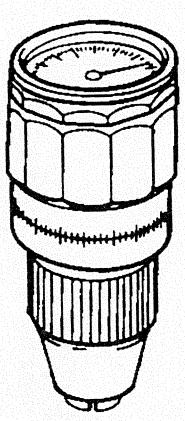


Tentelometer 4822 395 90584

Tool for tapetension adjustment 4822 395 50188

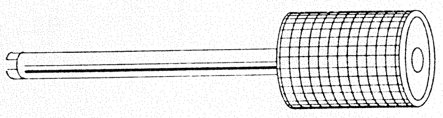


Handle 4822 256 90493



Torquemeter:

600 gf-cm 4822 395 90232
90 gf-cm 4822395 80196



Post adjustment screwdriver 4822 395 50275

Testcassette 4822 397 30103

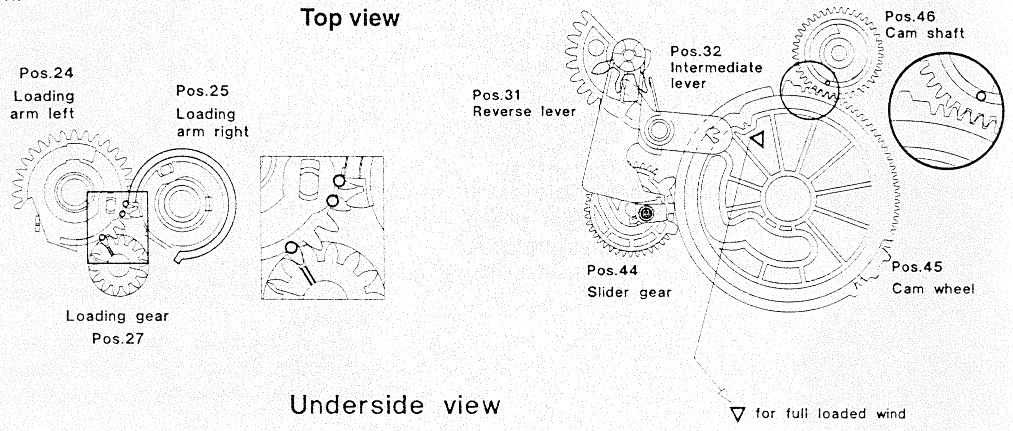
Nylon gloves 5322 395 94022

4.1.1 Deck lay out diagram

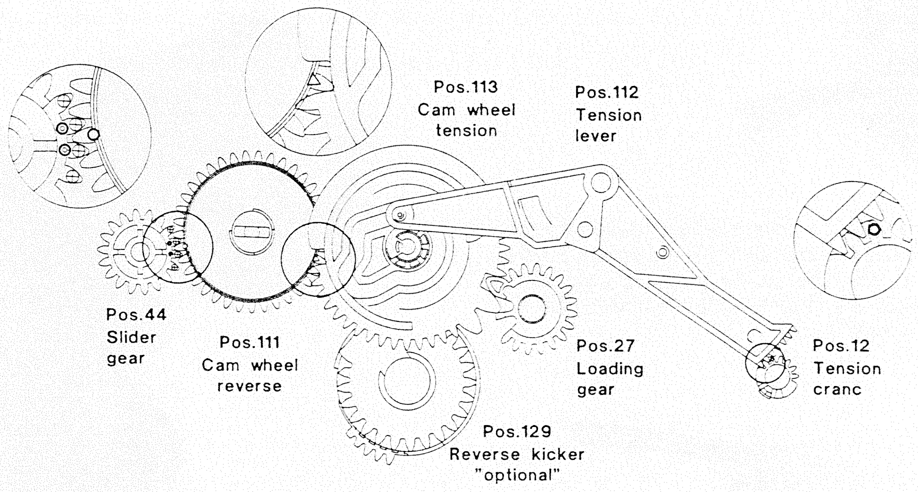
Deck in position „threaded out".

The following diagrams indicate the relative position of the gearwheels and levers when the deck is in the threaded out (cassette-compartment down) position.

Top view


Pos.24
Loading arm left
Pos.25
Loading arm right
Loading gear
Pos.27
Pos.31
Reverse lever
Pos.32
Intermediate lever
Pos.46
Cam shaft
Pos.44
Slider gear
Pos.45
Cam wheel
▽ for full loaded wind

Underside view


Pos.113
Cam wheel tension
Pos.112
Tension lever
Pos.44
Slider gear
Pos.111
Cam wheel reverse
Pos.27
Loading gear
Pos.12
Tension cranc
Pos.129
Reverse kicker
"optional"

4.1.2 The Lift

Refitting the lift compartment:
Ensure the lift compartment is down and gear A is rotated one click stop anticlockwise from the down position.
The removal and refitting of the lift can be carried out in all deck positions with the exception of „eject" (ensure that gears 103/105 are free).

To remove the lift:
Free the holding bracket (Fig. 2) by rotating it up and back from the upper end.
Unscrew the 4 screws on the underside of the deck.
Carefully remove the lift vertically, noting the position of the record protect operating lever.

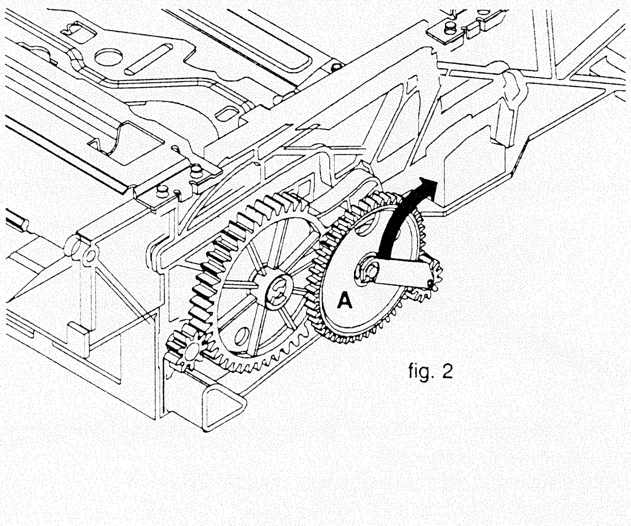


fig. 2

4.1.3 Head disc replacement

Removal :

Nylon gloves should be worn when handling the head disc.
Turn the headdisc until the long hole of the rotor appears in the bigger hole of the scannermotor
Insert the reference pin C (included with each service head disc) through the bigger hole of the lid of the scanner motor until the pin snaps in the long hole of the rotor. (Fig. 3)

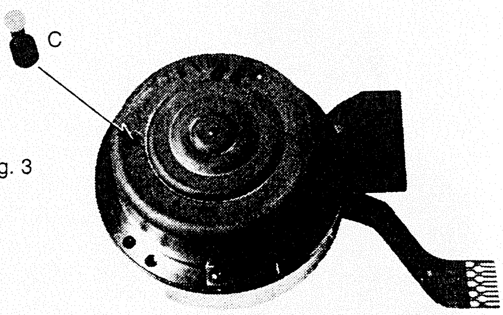


fig. 3

Important:

Choose Installation/Removal of the upper/lower clamping element by turning and attaching the reference element to the tool. (Fig. 4)

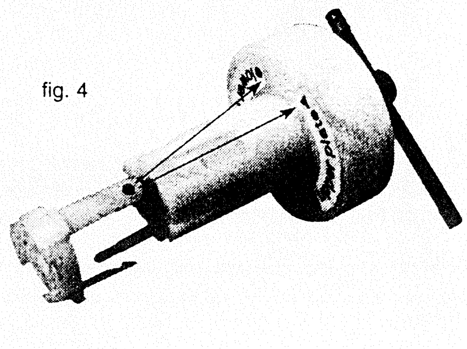
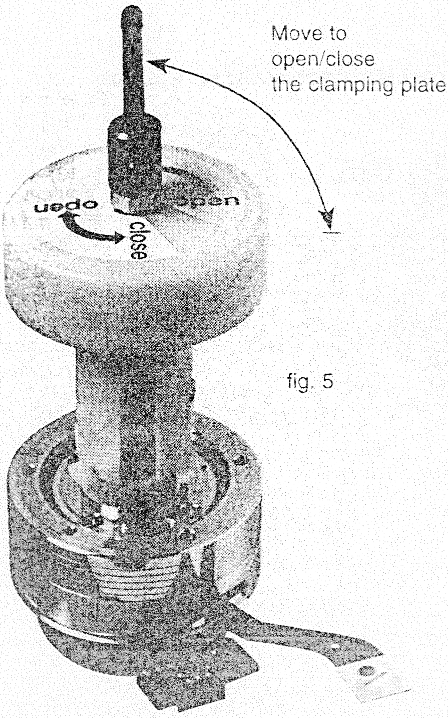


fig. 4



Position the tool on the upper clamping element, loosen the clamping element by turning the lever 90 degrees and remove it from the head disc. (Fig. 5)

fig. 5

Prepare the tool for the lower clamping element.Position the tool on the head disc and make sure that all 3 pins are snapped in the the lower clamping element. Loosen the clamping element by turning the lever 90 degrees and remove the head disc plus the tool from the scanner spindle. (Fig.6)

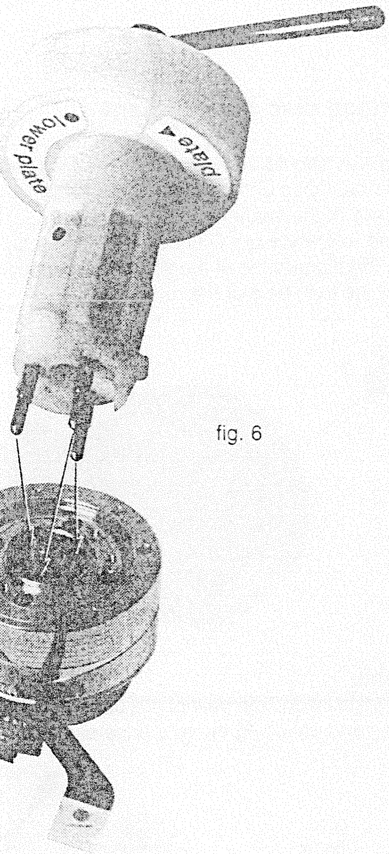


fig. 6

Installation:

Before carrying out the installation of the new head disc make sure that the scanner motor spindle is clean and undamaged. (The spindle has to be free of grease and must not be touched with bare hands)

Insert the 2 Mylar foils (included with each head disc) in the head disc. (Fig.7)

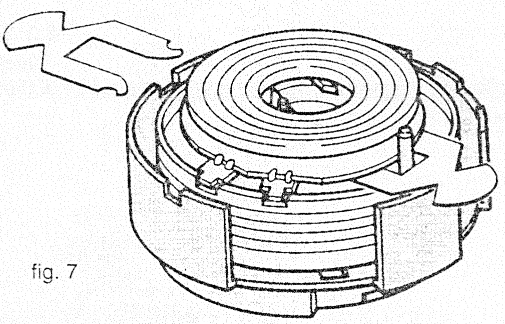


fig. 7

Position the tool (reference: lower clamping element) on the new headdisc (with protective cover) and loosen the lower clamping element.

Position the head disc so that pin D of the protective cover engages in the hole of the stator (the arrow on the protective cover must point towards the scanner print). (Fig. 8)

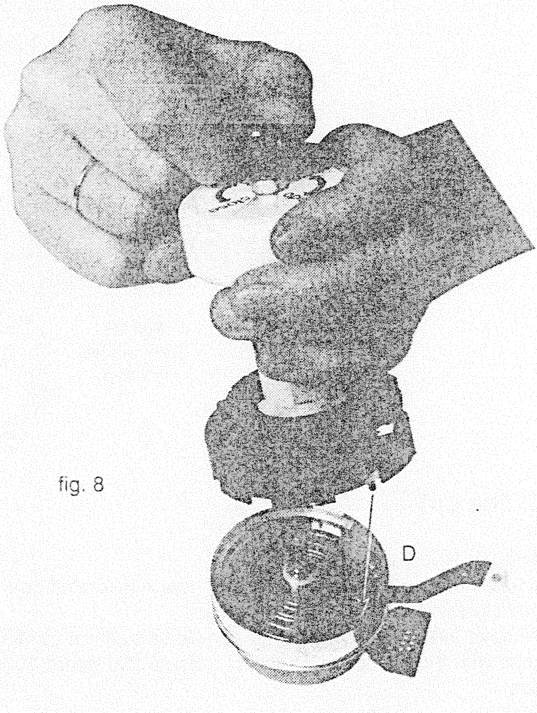


fig. 8

Reach the exact position through pressing the tool down with a force of 1 N. and fix the lower clamping element by turning the lever towards „close“.

Remove the tool.

Change the tool to „upper clamping element“ and position the clamping element exactly. (Fig. 9)

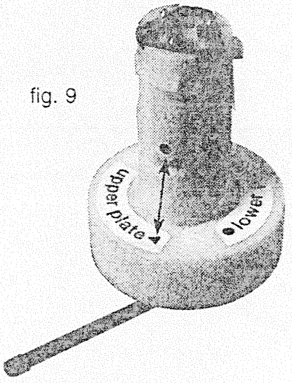


fig. 9

Tighten the clamping element through turning the lever towards „open“. Position the tool planely on the head disc and fix the clamping element. (Fig.5 „close“)

Remove the protecting cap from the head disc, withdraw the two Mylar foils and remove the reference pin C.

After replacing the head disc, carry out the following adjustments and checks :

Head switching pulse (gap position, chapter 3)

Write current adjustments (chapter 3)

Check tape path alignment (see paragraph 4.2.1.)

4.1.4 A/C Head (Combi head) (Pos. 36)

Remove the fixing spring (A) (fig. 10)
Remove the fixing screw and replace the A/C head.
Use a new fixing spring (included with new A/Chead) for reassembly.

After the A/C head has been replaced, all adjustments described in paragraph 4.2.1.2 and paragraph 4.2.2 have to be carried out.

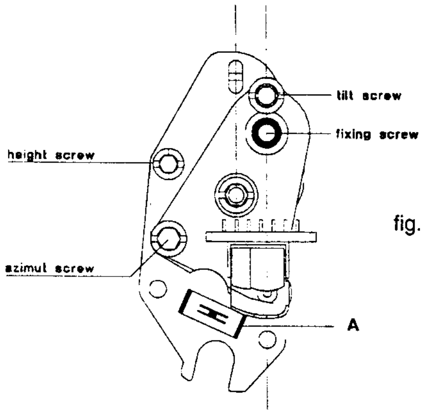


fig. 10

4.1.5 Threading motor (Pos. 38)

Remove the belt and disconnect the connector plug.
Remove the threading motor from the motor supports (Fig. 11).

During reassembly ensure that the threading motor is correctly located in the front and rear supports.

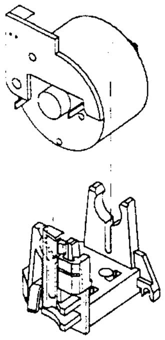


fig. 11

4.1.6 Capstan motor (Pos. 127)

Remove the tape deck.
Remove the belt (pos.126) on the underside;
Remove the three capstan motor fixing screws (Fig. 12) and withdraw the capstan motor downward from the drive assy.
The reassembly is carried out in reverse order. Make sure that the capstan is free of grease.

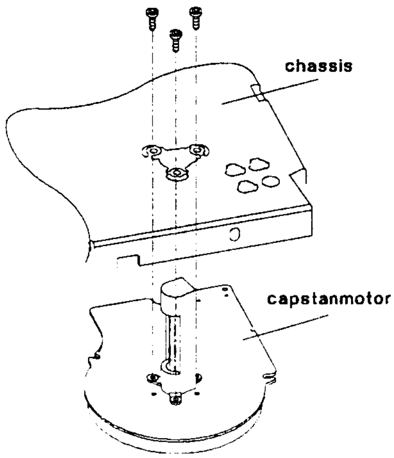


fig. 12

4.1.7 Pressure roller (Pos. 37)

Remove the tape deck
Unhook and remove the pressure roller tension spring.
Release the pressure roller guide (pos. 41) from the guide in the threading motor holder by pressing the top of the motor guide rearwards and rotating the pressure roller guide assembly clockwise by approximately a quarter of a turn (Fig. 13) The pressure roller and guide can now be lifted clear.

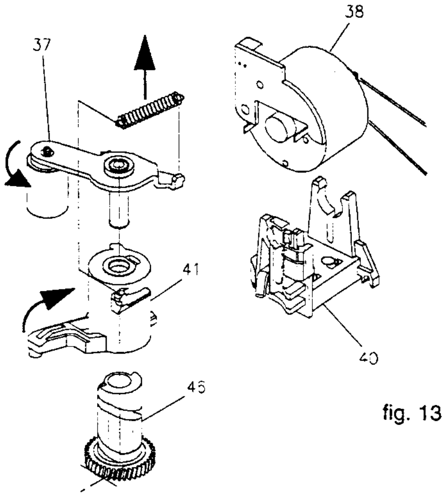
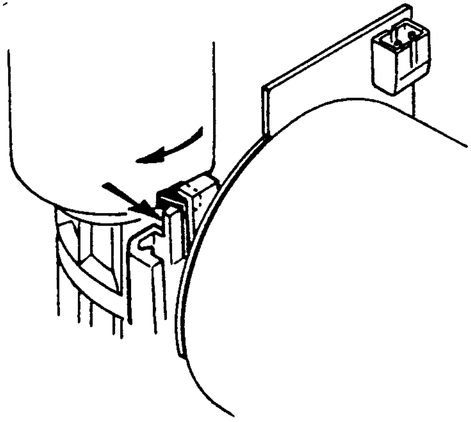


fig. 13



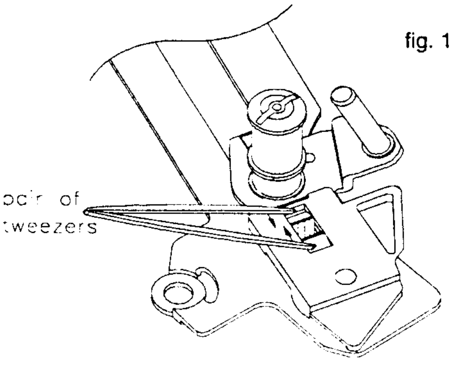
Ensure that no grease from the pressure roller guide gets to the capstan or pressure roller.
The reassembly is carried out in reverse order.

4.1.8 Roller unit right (Pos. 26)

Remove the tape deck.
Compress the two snap hooks by means of a pair of tweezers and remove the roller assy from the roller unit right (Fig. 14).
Unhinge the loading arm right from the holding plate and push the latter towards the front of the deck to remove from the guide (right).

NOTE: During reassembly ensure the link from 25 is engaged in the hole of the holder plate 26.
After replacing the roller unit (right), the tape path has to be checked, and adjusted if necessary (paragraph 4.2.1).

fig. 10



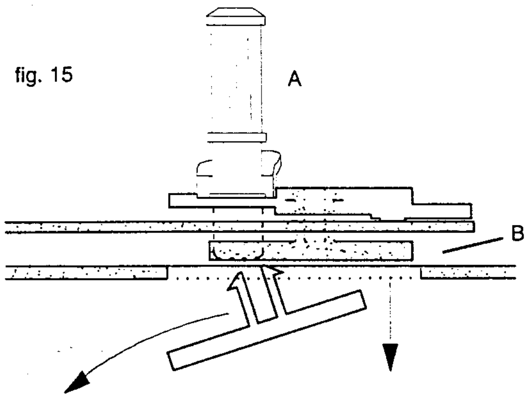
4.1.9 Roller unit left (Pos.23)

Set the drive assy to „Eject" position.
Unhook the tension arm spring (pos. 11), to avoid the tension arm spring being pre-loaded.
At the bottom side of the drive assy remove the tension lever (pos.112).
Compress the two snap hooks by means of a pair of tweezers (Fig. 9)and remove the roller assy (A) from the plate (B).
Unhinge the loading arm (left) from the holding plate and remove the latter downward from the drive assy through the recess in the chassis (Fig. 15).
The reassembly is carried out in reverse order.

NOTE : During reassembly
1. Place the carriage holding plate in the assembly with the half-round cutout nearest the rear of the deck.
2. When the loading arm is refitted ensure the pin on the underside of 23 is through the link of 24B.

After replacing the roller unit (left) the tape path has to be checked (paragraph 4.2.1.), and adjusted if necessary.

fig. 15



4.2 Adjustments

4.2.1 Tape path

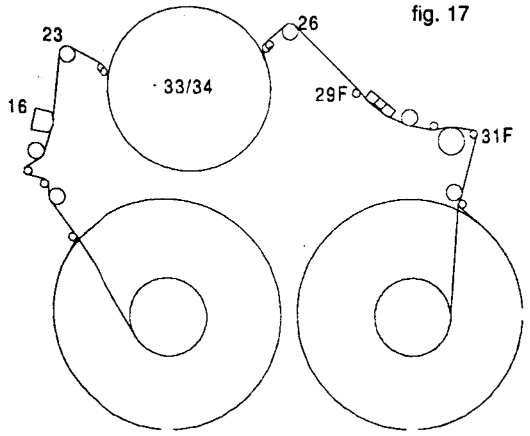

23
26
16
33/34
29F
31F

fig. 17

4.2.1.1 Roller left unit/roller unit right

Preparation:
Connect one input of a dual trace oscilloscope to observe the tape sync pulse CTL. The other input (DC coupled) to observe the tracking information TRIV.
Trigger the oscilloscope externally on the head pulse HP1.
Playback the black and white section of the alignment test tape.
Set the deck in the condition where the video heads are running along the upper edge of the tracks only by:

1. Call the service test program (chapter 2.1)
2. Activate manual tracking (service test program step 03) and watch the tape sync pulse move to the left in relation to the TRIV signal.
3. Note the extreme left hand position reached by the sync pulse, repeat as necessary.
4. Stop the movement of the pulse when the TRIV signal reduces to 1/2 to 2/3 maximum amplitude by pressing the normal play button. A noisy picture (disturbances) is visible on the TV set and the CTL pulse should be to the left of the display.

The recorder will hold this position until the service test progam step 03 is left.
This condition works only if X-distance is adjusted.

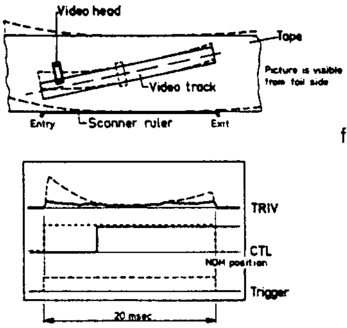

Video head
Tape
Picture is visible from foil side
Video track
Entry
Scanner ruler
Exit
TRIV
CTL
NOM position
Trigger
20 msec

fig. 18

Adjustment:
Adjust the left and right roller units to make the tracking signal TRIV straight and flat as possible (Fig. 18).

4.2.1.2 A/C Combi head

Tilt angle adjustment

Set the drive to feature mode (e.g. +7)
Adjustment :
By means of the tilt angle adjusting screw move the tape until the lower edge just touches the tape guide A1 (see Fig. 19) the tape must not be distorted at the lower edge (by pressing onto guide).

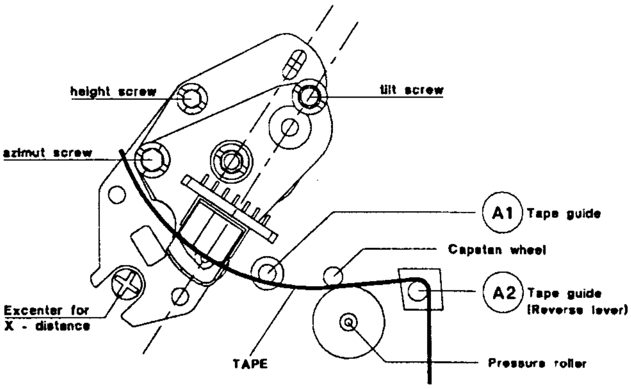

height screw
tilt screw
azimut screw
A1 Tape guide
Capstan wheel
A2 Tape guide (Reverse lever)
Excenter for X - distance
TAPE
Pressure roller

fig.19

Adjustment of the azimuth angle and the head height

Connect an oscilloscope to the linear Audio output.
Play the section of the test cassette with the audio signal 400 Hz.
Adjust for maximum output voltage by means of the height adjustment screw
Play the section of the test cassette with the audio signal 8 kHz.
Adjust to maximum output voltage by means of the azimuth adjustment screw (Fig. 19).
If necessary, repeat this procedure
Check the tilt angle adjustment

If the tape path was completely out of adjustment or if several components in the tape path have been replaced, it is possible, that the adjustments described in paragraph 4.2.1.1 and paragraph 4.2.1.2 have to be repeated several times.

4.2.2 Adjustment of the horizontal distance (x-distance)

Before this adjustment is carried out, insert the test cassette (start from Eject position). Call the service test program (tracking value will take up its nominal position) and press the „play" button. Playback the black/white part of the test cassette.)
Display the TRIV signal on an oscilloscope (DC-coupled) and adjust for maximum voltage by means of the excentric screw (Fig.19).

4.2.3 Brake band and tape tension

Due to further development it is no longer necessary to make theseadjustments after replacement of the brake band.
If the brake band or tape tension are completely misadjusted, set them to a center position; set the drive to „play" and adjust the brake band until the edge of the elbow of the tape tension arm is aligned with the left inner edge of the left guide (fig. 20).

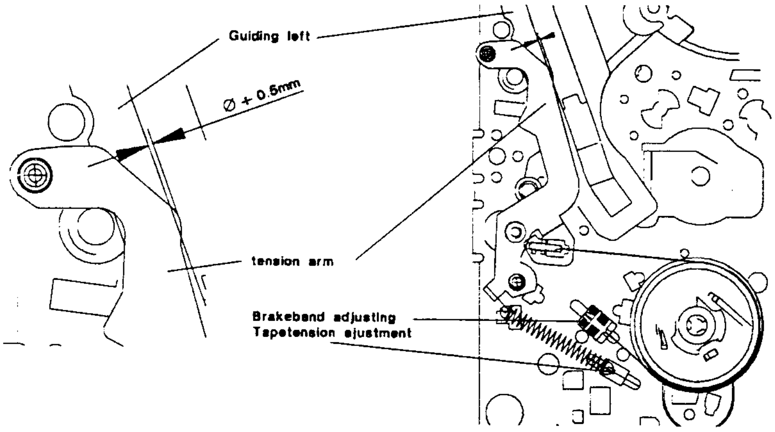
4.2.4 Friction clutch control check

Set the drive to „Play" position.
Place the torquemeter on the right reel.
Turn the capstan motor to move the right reel clockwise.
Keep turning, until the indication at the torquemeter no longer changes (Fig. 21)
The torque has to be 10,5 mNm +/-25% (105gFcm +/-25%)

4.2.5 Reverse brake control

Set the drive to „Reverse" position.
Place a torquemeter on the right reel and turn the latter counterclockwise, until the reel just starts to flip.
The value indicated at the torquemeter has to be 7mNm +/-3mNm (70 gFcm +/-30gFcm) (Fig. 21).

fig. 20



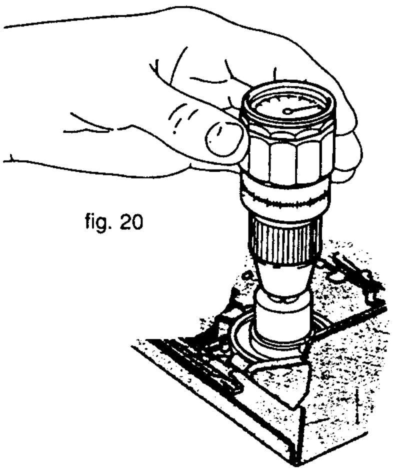
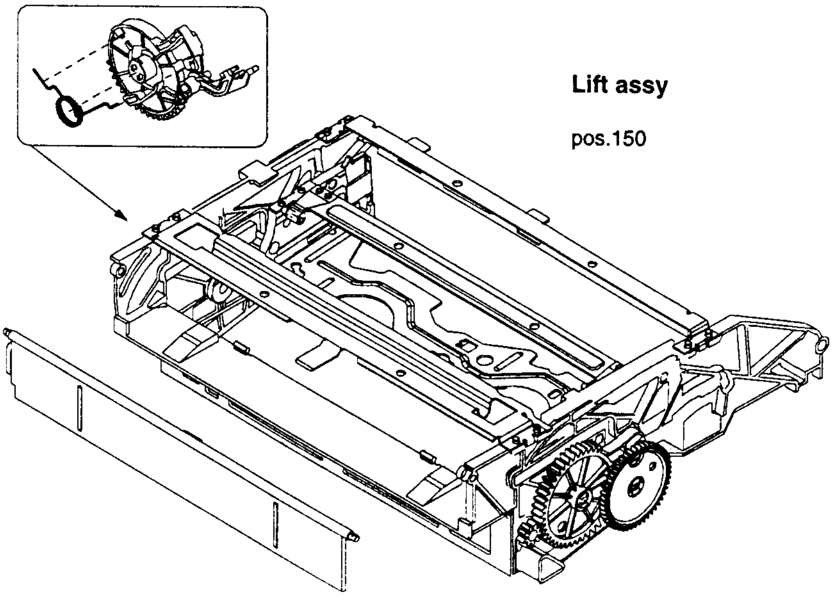


fig. 20

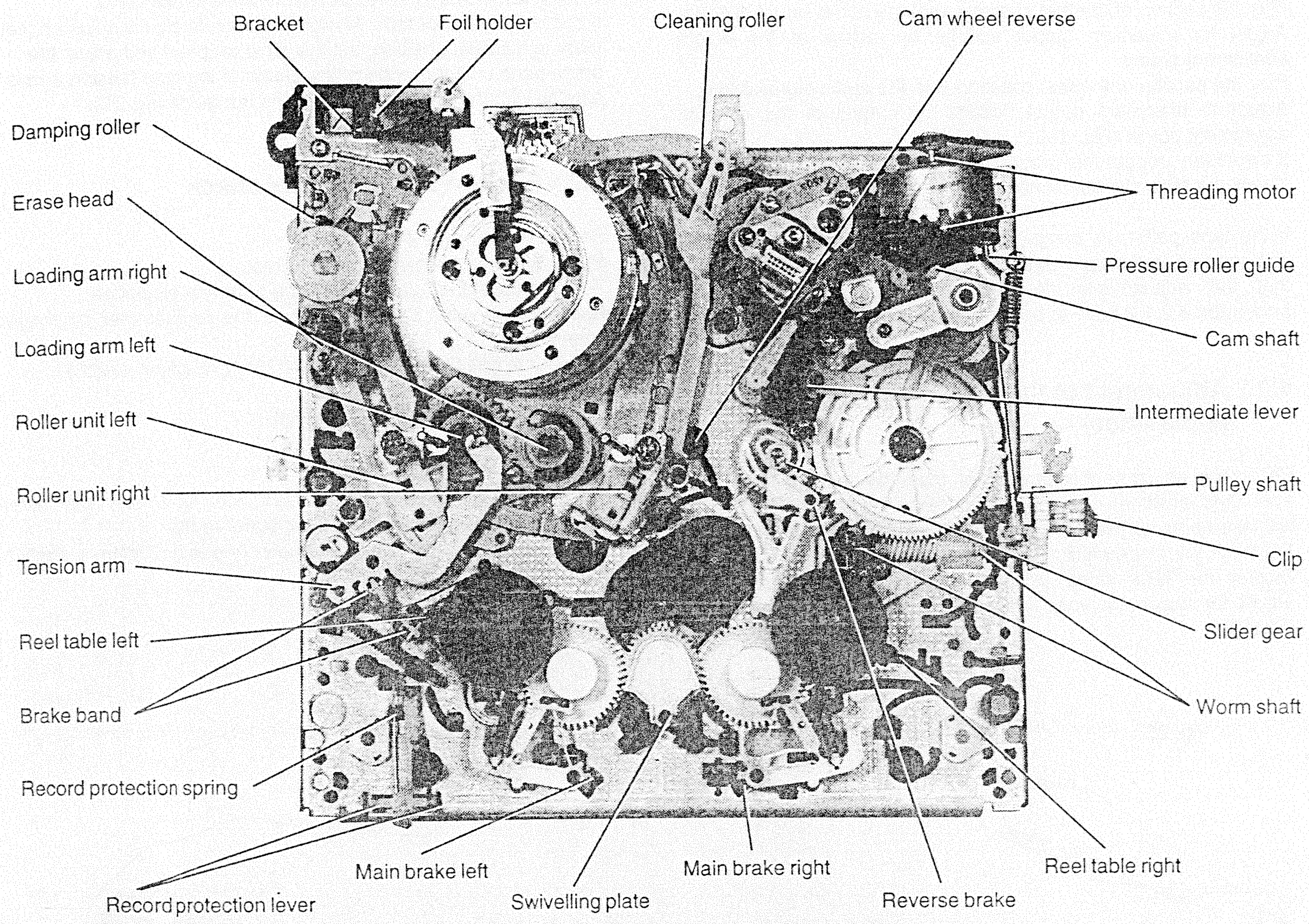


Lift assy

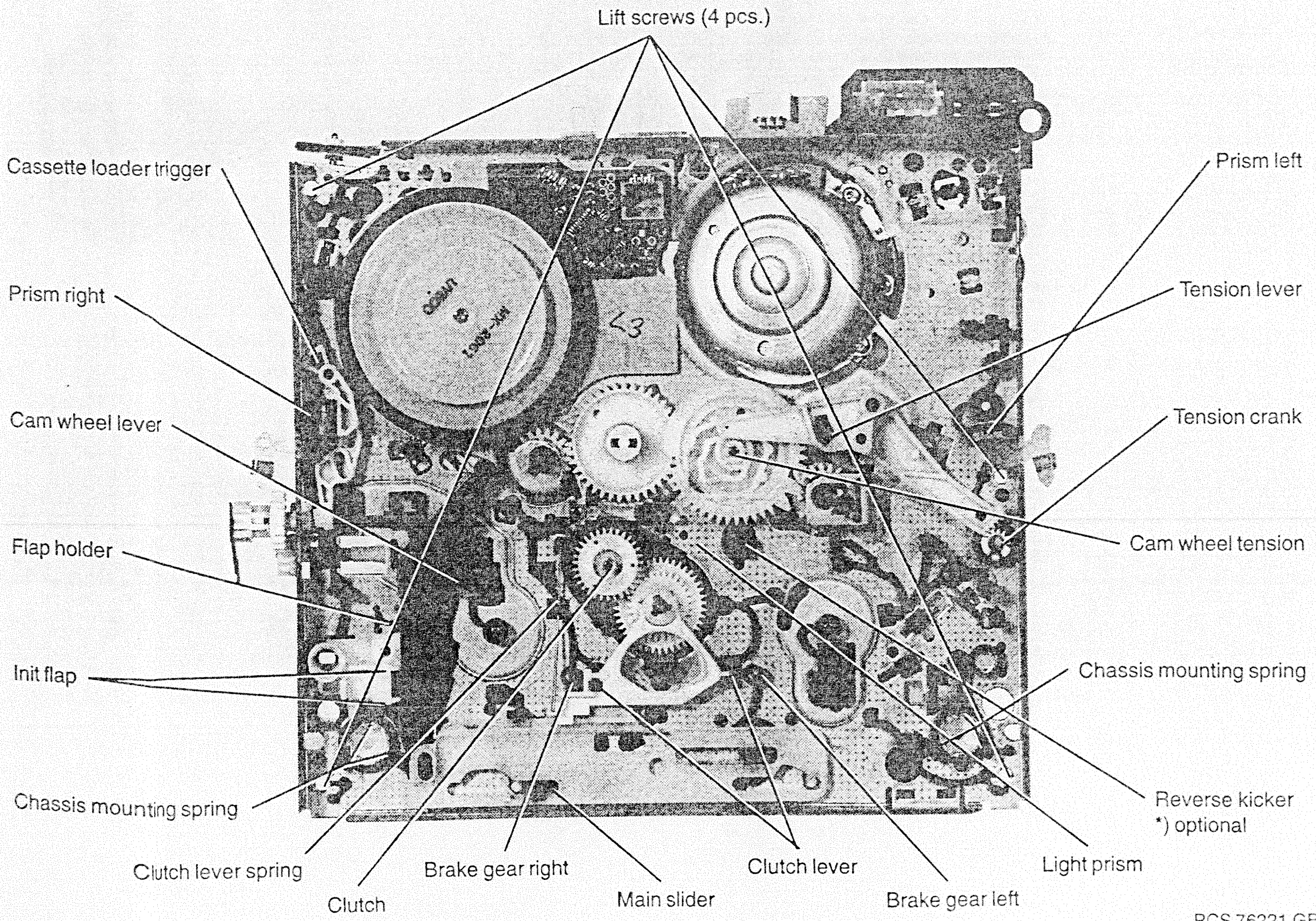
pos.150

In order to make the replacement of the deck parts easier, the snap hooks are marked with an arrow

TOP VIEW


Bracket
Foil holder
Cleaning roller
Cam wheel reverse
Damping roller
Erase head
Loading arm right
Loading arm left
Roller unit left
Roller unit right
Tension arm
Reel table left
Brake band
Record protection spring
Threading motor
Pressure roller guide
Cam shaft
Intermediate lever
Pulley shaft
Clip
Slider gear
Worm shaft
Main brake left
Main brake right
Reel table right
Record protection lever
Swivelling plate
Reverse brake

UNDERSIDE VIEW


Lift screws (4 pcs.)
Cassette loader trigger
Prism right
Cam wheel lever
Flap holder
Init flap
Chassis mounting spring
Prism left
Tension lever
Tension crank
Cam wheel tension
Chassis mounting spring
Reverse kicker
*) optional
Clutch lever spring
Clutch
Brake gear right
Main slider
Clutch lever
Brake gear left
Light prism

4.3 Exploded view

Top view

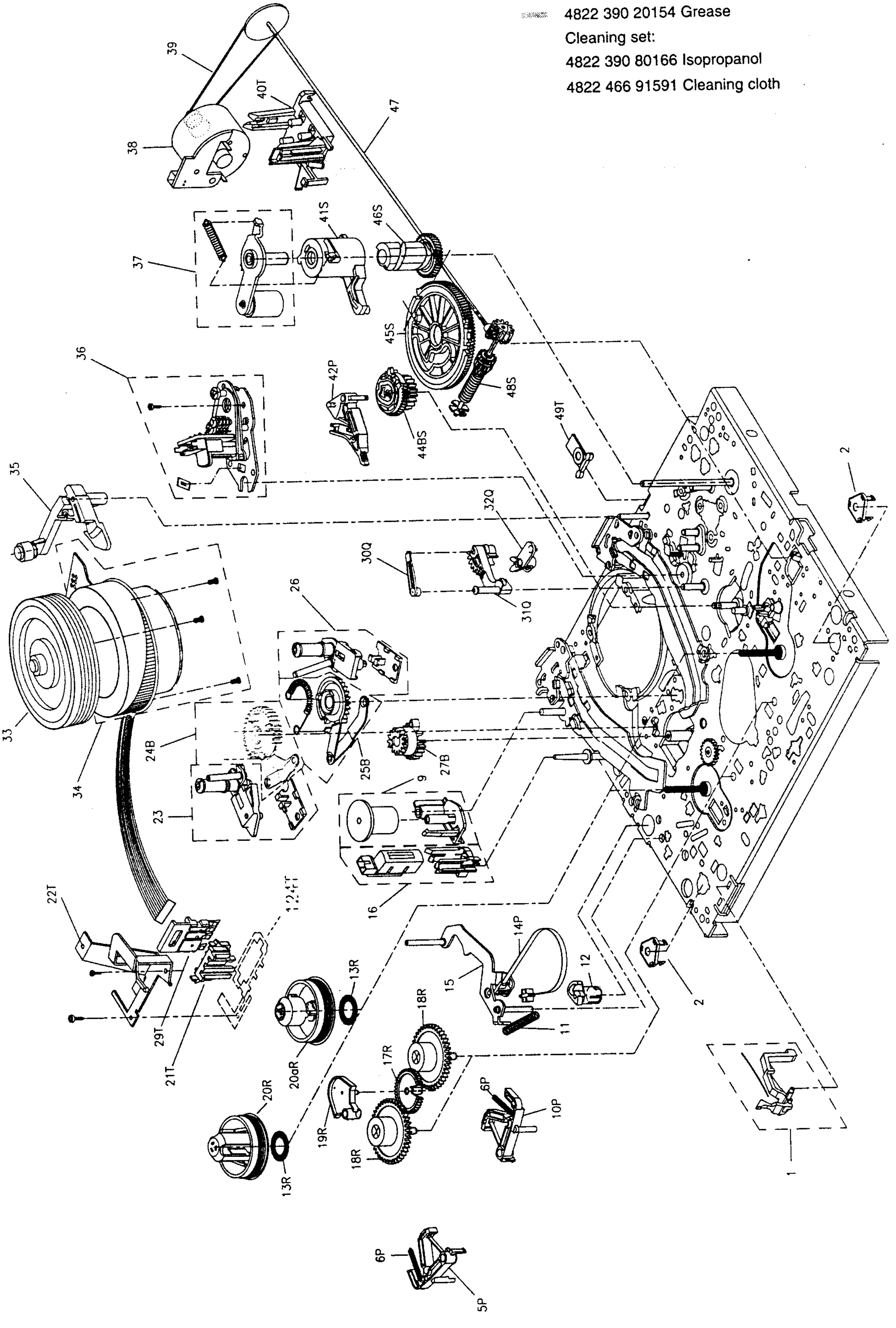
■ 4822 390 10096 Oil

▨ 4822 390 20154 Grease

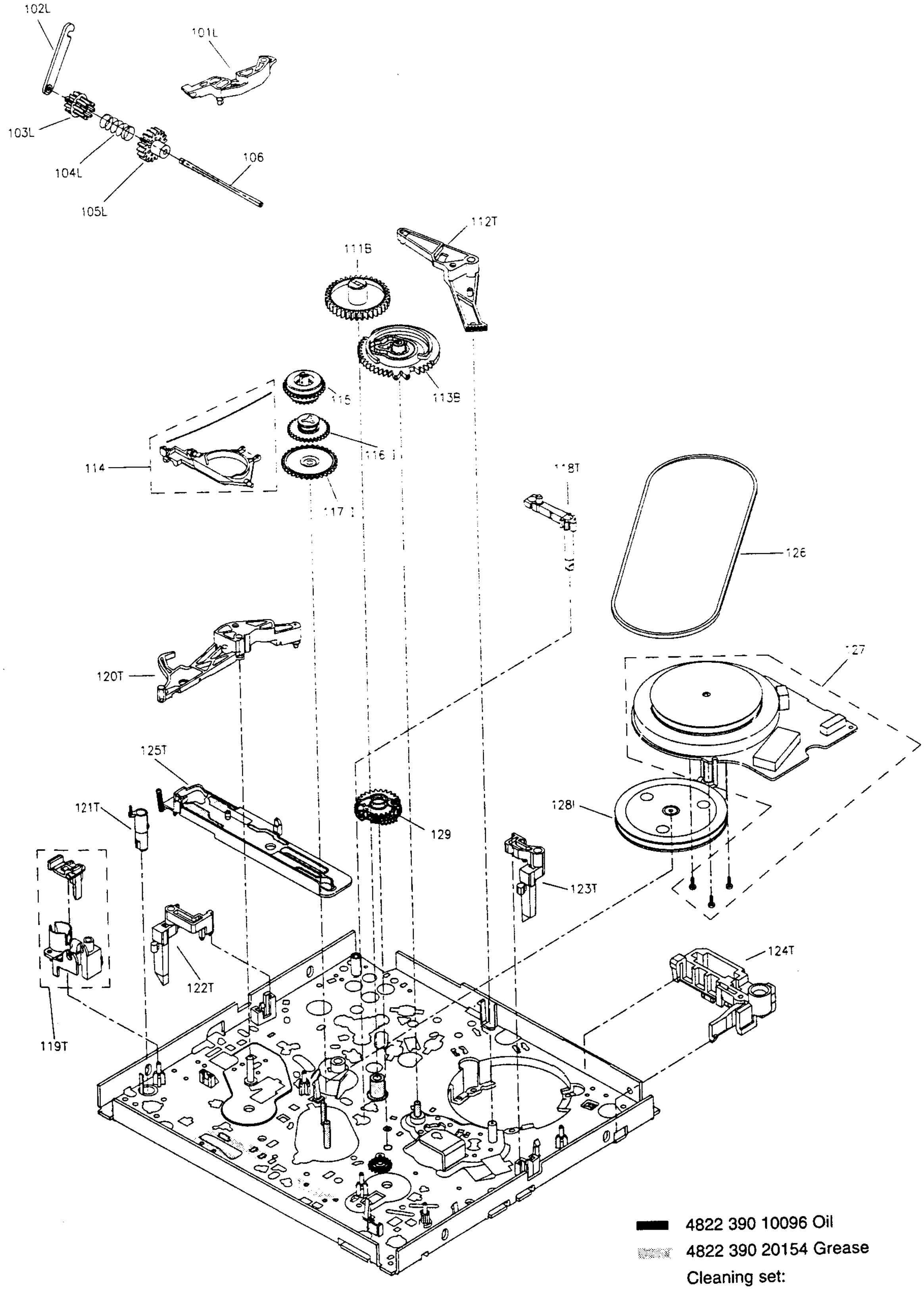
Cleaning set:

4822 390 80166 Isopropanol

4822 466 91591 Cleaning cloth


39
40T
47
38
41S
46S
37
45S
48S
36
42P
44BS
49T
2
35
32Q
30Q
31Q
26
33
24B
25B
27B
9
34
23
16
22T
124T
14P
12
15
13R
18R
29T
21T
20aR
17R
11
2
20R
19R
6P
10P
18R
13R
1
6P
5P

Underside viw


102L
101L
103L
104L
105L
106
112T
111B
113B
115
116
114
117
118T
126
127
120T
125T
121T
129
128
123T
119T
122T
124T

▬ 4822 390 10096 Oil

▨ 4822 390 20154 Grease

Cleaning set:

4822 390 80166 Isopropanol

4822 466 91591 Cleaning cloth

MECHANICAL PARTS LIST

Pos.	Description	KITS								Code number 4822
		B	I	L	P	Q	R	S	T	
1	Rec. protection lever (with spring)									402 10202
2	Chassis mounting spring (2x)									492 71022
5	Main brake left				P					
6	Main brake spring (2x)				P					
9	Damping roller *)									528 70782
10	Main brake right				P					
11	Tension arm spring									492 33317
12	Tension crank									403 70551
13	Slip ring						R			
14	Tension band				P					
15	Tension arm									403 70547
16	Erase head									249 10522
17	Swivelling gear						R			
18	Brake gear (2x)						R			
19	Swivelling plate						R			
20	Reel table (S)						R			
20a	Reel table (T)						R			
21	Foil holder								T	
22	Bracket								T	
23	Roller unit left									528 70771
24	Loading arm left	B								
25	Loading arm right	B								
26	Roller unit right									528 70772
27	Loading gear	B								
29	Plate								T	
30	Reverse clip					Q				
31	Reverse lever					Q				
32	Intermediate lever					Q				
33	Head disc 4/2									691 10548
33	Head disc 4/2 Secam									691 10551
34	Scanner motor 4/2 (with screws)									361 10901
35	Cleaning roller									528 70773
36	A/C Head (with clip and screws)									249 10468
37	Pressure roller (with spring)									528 70774
38	Threading motor									361 10809
39	Threading belt									358 20421
40	Motor holder								T	
41	Pressure roller guide							S		
42	Reverse brake				P					
44	Slider gear	B						S		
45	Cam wheel							S		
46	Cam shaft							S		
47	Pulley shaft									528 81462
48	Worm shaft							S		
49	Chassis mounting clip								T	

Pos.	Description	KITS								Code number 4822
		B	I	L	P	Q	R	S	T	
101	Cassette loader trigger			L						
102	Clip			L						
103	Cassette loader gear1			L						
104	Cassette loader spring			L						
105	Cassette loader gear2			L						
106	Spindle									535 93277
111	Cam wheel reverse	B								
112	Tension lever								T	
113	Cam wheel tension	B								
114	Clutch lever (with spring)									403 70549
115	Clutch									528 20736
116	Changing gear		I							
117	Double gear		I							
118	Light prism								T	
119	Init flap and holder								T	
120	Cam wheel lever								T	
121	S-VHS lever								T	
122	Prism rihgt								T	
123	Prism left								T	
124	Holder								T	
125	Main slider								T	
126	Driving belt									358 31166
127	Capstan motor (with screws)									361 10805
128	Gear pulley		I							
140	Flex cable									320 40287
150	Lift									443 64112
KIT	B									310 31955
KIT	I									310 31963
KIT	L									310 32116
KIT	P									310 32191
KIT	Q									310 10658
KIT	R									310 10659
KIT	S									310 10661
KIT	T									310 10662

*) for decks: WDMT-...

Um eine hohen Reparaturstandard zu gewährleisten sind mit Ausnahme von Kit T immer alle im Kit enthaltenen Teile zu tauschen.

In order to guarantee a high repairstandard all spare parts included in a kit have to be replaced with the exception of kit T.

Per una riparazione garantita ocorre sostituire tutti i pezzi contenuti nei kit, fatta eccetione per il kit T.

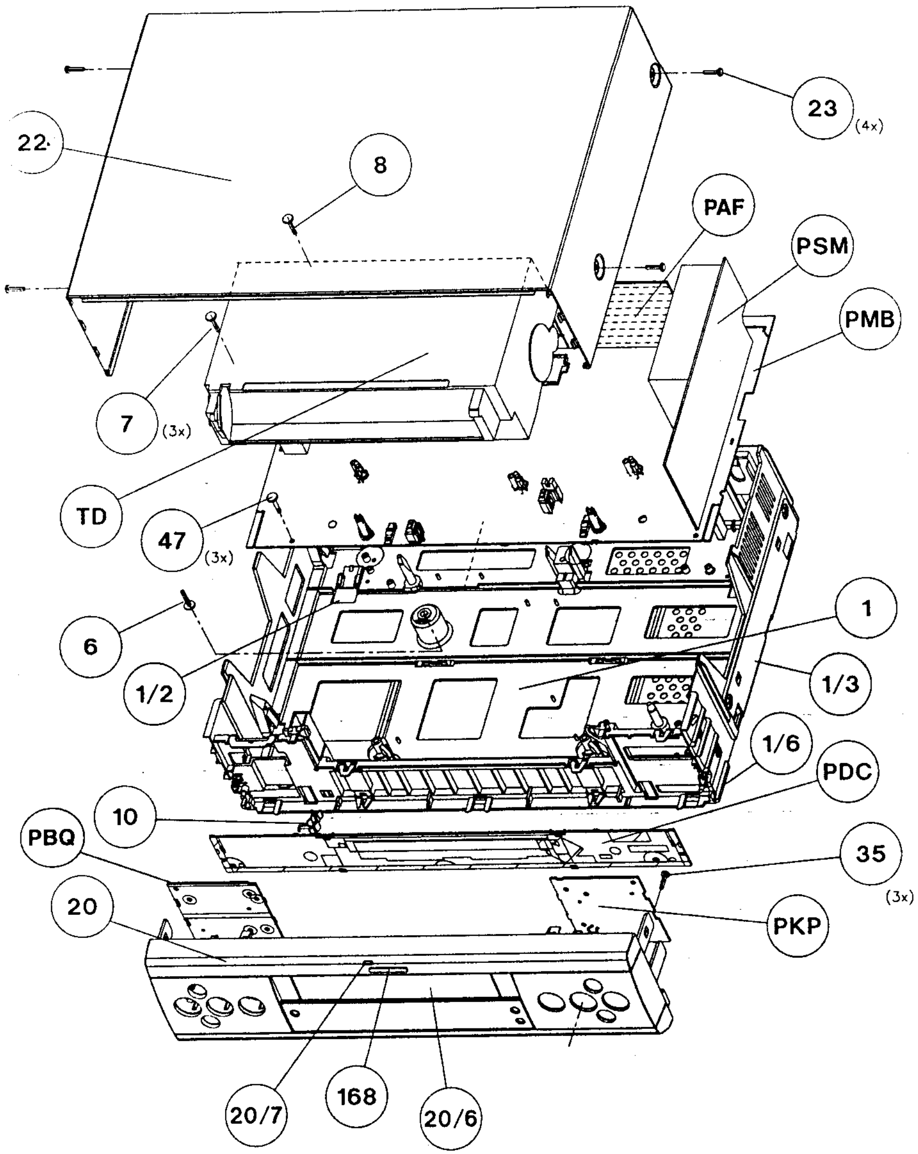
Para obtener un estandár de reparaciones elevado,es necesario cambiar todas las partes contenidas en el kit, la única exceptión es para el kit T.

A fin d'obtenir un standard de réparations élevé, toutes les pièces de rechange incluses dans un kit sont à remplacer, exception faite du kit T.

Om een hoge reparatiekwaliteit te waarbogen moeten, met uitzondering van kit T, altijd alle zich in een kit bevindende onderdelen worden vervangen.

PARTS LISTS

Exploded View set



Partslist

Pos	Service Code	Description	VR665/02	VR665/05	VR665/16	VR665/58	SB65/02	SB65/03	SB65/16	SB65/38	SB75/11	SB75/38	DV60/39	DV65/05
1/1	4822 464 10201	FRAME	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
1/2	4822 492 11085	SPRING	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
1/3	4822 442 00278	BOTTOM	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
1/6	4822 462 41806	FOOT	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
6	4822 502 14107	CHASSIS SCREW	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
7	4822 502 13884	SCREW 3,5x16	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
8	4822 502 14108	SCREW	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
20	4822 426 10268	CONTROL PANEL	✔											
	4822 426 10278	CONTROL PANEL		✔										
	4822 426 10282	CONTROL PANEL			✔									
	4822 426 10279	CONTROL PANEL				✔								
	4822 426 10301	CONTROL PANEL					✔							
	4822 426 10267	CONTROL PANEL						✔						
	4822 426 10285	CONTROL PANEL							✔					
	4822 426 10281	CONTROL PANEL								✔				
	4822 426 10286	CONTROL PANEL									✔			
	4822 426 10287	CONTROL PANEL										✔		
	4822 426 10283	CONTROL PANEL											✔	
	4822 426 10284	CONTROL PANEL												✔
20/6	4822 443 10422	LIFT FLAP	✔		✔	✔								
	4822 443 10428	LIFT FLAP		✔										
	4822 443 10451	LIFT FLAP					✔							
	4822 443 10421	LIFT FLAP						✔						
	4822 443 10432	LIFT FLAP							✔					
	4822 443 10433	LIFT FLAP								✔				
	4822 443 10441	LIFT FLAP									✔			
	4822 443 10439	LIFT FLAP										✔		
	4822 443 10492	LIFT FLAP											✔	
	4822 443 10431	LIFT FLAP												✔
20/7	4822 492 70896	SPRING	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
22	4822 442 00565	COVER LACQUERED	✔	✔	✔	✔								
	4822 442 00564	COVER LACQUERED					✔	✔				✔	✔	✔
	4822 442 00311	COVER LACQUERED									✔			
	4822 442 00563	COVER LACQUERED							✔	✔		✔		
23	4822 502 14109	SCREW 3,5x10	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
35	4822 502 11839	SCREW 2,9x8	✔	✔	✔	✔								
47	4822 502 14115	SCREW 3,15x8	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
150/1	4822 321 10249	MAINS CORD	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	
	4822 321 10886	MAINS CORD + Fuse		✔										✔
150/2	4822 320 50377	ANTENNA CABLE PAL	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
150/9	4822 321 63002	SCART CABLE (PROJECT 50)								✔	✔	✔	✔	
168	4822 459 10886	WORDMARK PHILIPS	✔	✔	✔	✔								
	4822 459 11109	WORDMARK PHILIPS					✔							
	4822 459 10941	WORDMARK PYE												✔
	4822 459 10896	WORDMARK RADIOLA							✔	✔		✔		
	4822 459 10898	WORDMARK ARISTONA						✔						
	4822 459 10923	WORDMARK SCHNEIDER											✔	
	4822 459 10912	WORDMARK SBR									✔			
1003	4822 212 10663	KEY BOARD PKP 11	✔	✔	✔	✔								
8001	4822 320 11636	FFC TD1-1961	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
8002	4822 323 10314	FCC TD2-1962	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
8003	4822 320 11332	FFC TD3-1944	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
8004	4822 320 11333	FFC TD4-1930	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
8005	4822 320 11334	FFC 1922-1101	✔	✔	✔	✔								
8020	4822 320 11335	FFC 1921-1941	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔

PSM1, PSM2, PSM2A

MISCELLANEOUS

0010⚠	4822 256 30514	FUSE HOLDER
0011⚠	4822 256 30514	FUSE HOLDER
1010⚠	4822 070 31252	FUSE T 1.25 A

CONNECTORS

0008⚠	4822 267 31064	MAINS Connector
1509	4822 265 10484	Connector 18P

CAPACITORS

2012	4822 121 10524	910	pF	100V	
2014	4822 124 11559	2.2	µF	50V	
2016	4822 121 42687	3,3	nF	63V	
2018	4822 121 51299	1	nF	50V	
2026	4822 121 51299	1	nF	50V	
2030	5322 121 42386	100	nF	63V	
2032	5322 121 42386	100	nF	63V	
2036	4822 124 80874	47	µF	50V	
2042	4822 121 70481	47	nF	400V	
2050⚠	4822 121 70674	68	nF	250V	
2052⚠	4822 121 70674	68	nF	250V	
2054⚠	4822 126 13859	470	pF	250V	
2056⚠	4822 126 13859	470	pF	250V	
2059⚠	4822 126 13859	470	pF	250V	
2060	4822 121 10525	330	nF	100V	
2062	4822 124 80875	220	µF	25V	
2064	5322 121 42661	330	nF	63V	
2068	4822 124 80874	47	µF	50V	
2069	4822 122 31175	1	nF	500V	
2070⚠	4822 124 11561	47	µF	400V	
2074	5322 121 42386	100	nF	63V	
2076	4822 124 80874	47	µF	50V	
2079	5322 121 42661	330	nF	50V	
2080	5322 121 42578	100	nF	250V	
2081	4822 124 80874	47	µF	50V	
2081	4822 124 41751	470	µF	50V	for PSM2
2084	4822 124 41747	680	µF	35V	
2085	4822 124 80874	47	µF	50V	
2088	4822 124 80875	220	µF	25V	
2090	4822 124 80875	220	µF	25V	
2092	5322 121 42386	100	nF	63V	
2096	4822 122 31116	2,2	nF	400V	
2098	4822 124 41747	680	µF	35V	
2099	4822 124 41747	680	µF	35V	

RESISTORS

3010	4822 116 83864	10	k	0,5W	
3012	4822 050 11002	1	k	0,4W	
3014	4822 050 13902	3,9	k	0,4W	
3016	4822 116 52244	15	k	0,5W	
3018	4822 116 52257	22	k	0,5W	
3020	4822 116 52251	18	k	1/6W	
3022	4822 050 11003	10	k	0,4W	
3026	4822 116 52228	680	R	0,5W	
3028	4822 116 52304	82	k	0,5W	
3030	4822 116 52303	8,2	k	0,5W	
3032	4822 116 52195	47	R	0,5W	
3034	4822 116 52202	82	R	0,5W	
3040	4822 116 52283	4,7	k	0,5W	
3041	4822 050 23309	33	R	0,6W	
3042	4822 050 21003	10	k	0,6W	
3043	4822 050 21003	10	k	0,6W	
3044	4822 050 21003	10	k	0,6W	
3046	4822 050 21808	1,8	R	0,6W	
3048	4822 050 21508	1,5	R	0,6W	
3048	4822 050 21808	1,8	R	0,6W	for PSM1
3050	4822 116 83882	39	k	0,5W	
3052	4822 116 83882	39	k	0,5W	
3054	4822 050 21005	1	M	0,6W	
3055	4822 050 21005	1	M	0,6W	
3056	4822 050 21005	1	M	0,6W	
3057	4822 050 21005	1	M	0,6W	
3058⚠	4822 053 21395	3,9	M	0,5W	
3059⚠	4822 053 21395	3,9	M	0,5W	
3060	4822 116 83872	220	R	0,5W	
3061	4822 050 24708	4,7	R	1/8W	
3062	4822 116 83864	10	k	0,5W	
3063	4822 116 83872	220	R	0,5W	
3064	4822 116 52283	4,7	k	0,5W	
3067	4822 116 83872	220	R	0,5W	
3068	4822 116 52186	22	R	0,5W	
3069	4822 050 24708	4,7	R	1/8W	
3070	4822 116 83872	220	R	0,5W	
3071	4822 116 52199	68	R	1/6W	
3072	4822 050 11002	1	k	0,4W	
3073	4822 116 52234	100	k	1/6W	
3074	4822 116 52289	5,6	k	0,5W	
3075	4822 116 52291	56	k	1/6W	
3076	4822 116 52263	2,7	k	1/6W	
3077	4822 116 52259	2,4	k	1/6W	
3078	4822 100 12163	470	R		
3079	4822 116 52234	100	k	1/6W	
3080	4822 052 10479	47	R		
3081	4822 116 52226	560	R	1/6W	
3082	4822 116 52283	4,7	k	1/6W	
3083	4822 116 52226	560	R	1/6W	
3084	4822 116 52283	4,7	k	1/6W	
3085	4822 116 52226	560	R	1/6W	
3086	4822 116 52234	100	k	1/6W	
3087	4822 050 15603	56	k		
3088	4822 116 52291	56	k	1/6W	
3089	4822 050 15603	56	k		
3090	4822 050 23902	3,9	k	0,6W	
3092	4822 050 11002	1	k	0,4W	
3094	4822 116 52245	150	k	0,5W	
3096	4822 116 52234	100	k	0,5W	
3098	4822 116 52291	56	k	0,5W	
3099	4822 116 52283	4,7	k	1/6W	

COILS

5010⚠	4822 157 10454	Coil	
5050⚠	4822 146 10445	TRANSF. B 324C2	
5050⚠	4822 146 10463	TRANSF. A 324C2	for PSM1
5069	4822 157 60147	2,2UH	
5080	4822 157 71461	22UH 10%	
5081	4822 157 52285	6,8 µH	
5088	4822 157 71461	22UH 10%	
5090	4822 157 71461	22UH 10%	
5098	4822 157 71461	22UH 10%	

DIODES

6032	4822 130 31631	BYV10-20
6036	4822 130 30842	BAV21
6042	4822 130 10439	BY268 A
6046⚠	4822 130 31438	1N4001G
6048⚠	4822 130 31438	1N4001G
6050	5322 209 12018	DF08M
6076	4822 130 82885	BYT52M
6080	4822 130 83909	BYW98-200RL
6081	4822 130 82885	BYT52M
6082	4822 130 82885	BYT52M
6084	4822 130 34142	BZX79-B33
6088	4822 130 83909	BYW98-200RL
6092	4822 130 83909	BYW98-200RL
6098	4822 130 83934	MBR360

TRANSISTORS & IC's

7020⚠	4822 209 90025	MC44603P
7040	4822 130 63794	STP3NA60
7050	4822 130 44503	BC547C
7056	4822 130 44503	BC547C
7058	4822 130 41344	BC337-40
7060	4822 130 41327	BC327-40
7070⚠	4822 209 32126	SOC1012T
7074	4822 209 81397	TL431CLPST
7084	4822 130 44503	BC547C
7085	4822 209 81397	TL431CLPRE
7088	4822 209 72742	L7812ACV
7090	4822 130 10237	MTD3055V1
7096	4822 130 44503	BC547C

⚠ ... Safety component, use only this type

MOBO PAL - BG - I - SECAM

MISCELLANEOUS

0020	4822 256 10197	HOLDER	
0021	4822 256 10197	HOLDER	
0022	4822 256 10197	HOLDER	
0030	4822 256 10198	HOLDER	
0031	4822 256 10198	HOLDER	
0040	4822 256 10196	HOLDER	
0041	4822 256 10195	HOLDER	
1000	4822 242 81067	Crystal 4.433 619 MC	
1400	4822 242 82059	Crystal 10MC	
1401⚠	4822 071 56301	Fuse 630mA	
1402⚠	4822 071 55001	Fuse 500mA	
1403⚠	4822 071 58009	Fuse 80mA	
1405⚠	4822 071 56301	Fuse 630mA	
1460	4822 277 11521	Switch	
1461	4822 277 11521	Switch	
1701	4822 210 10698	TUMOD TP926	(SECAM)
1701	4822 210 10697	TUMOD TP916	(PAL-G)
1701	4822 210 10709	TUMODG1-104A	(PAL-I-IRL)
1701	4822 210 10723	TUMOD	(PAL-G/K)
1719	4822 242 82062	B39389-L9454-M100	(SECAM)
1719	4822 242 82233	OFWK9460M	(PAL-G/K)
1720	4822 242 10575	OFWJ1980M	(PAL-I)
1720	4822 242 81964	OFWG1984M	(SECAM)
1721	4822 242 81436	OFWK3953M	(SECAM)
1721	4822 242 81964	OFWG1984M	(PAL)
1721	4822 242 80295	OFWG3962M	(PAL-G/K)
1740	4822 242 72586	TPS5,5MB-TF20	(PAL-SEC)
1740	4822 242 81572	0MB-TF21F	(PAL-I)
1741	4822 242 81301	TPS6, 5MB	(PAL-I)
1745	4822 242 70279	SFE6,0MB	(PAL-SEC)
1745	4822 242 10429	FIL CER 6MHZ5	(PAL G/K)
1745	4822 242 10428	FIL CER 5MHZ5	(SECAM)
1746	4822 242 10428	EFCT5R5YS5A	
1747	4822 242 10563	EFCT5R74YS5A	

CONNECTORS

1915	4822 267 10364	Conn. 9P
1917	4822 267 31513	SCART SOCKET ORANGE
1930	4822 267 41062	Conn. 6P
1941	4822 267 10365	Conn. 20P
1944	4822 265 30989	Conn. 3P SS>CBL0,3-1,25
1946	4822 267 10366	Conn. 8P
1961	4822 267 31512	Conn. 2 P
1962	4822 267 40696	Conn. 3 P

CAPACITORS

2001	5322 122 32654	22	nF	63V
2002	4822 124 23053	1	µF	63V
2003	4822 122 33797	47	nF	50V
2004	4822 122 33797	47	nF	50V
2005	4822 124 23053	1	µF	63V
2006	4822 126 10002	100	nF	25V
2007	4822 122 33177	10	nF	50V
2008	4822 124 41969	1	µF	50V
2009	4822 126 10002	100	nF	25V
2010	4822 124 80231	47	µF	16V
2011	4822 122 33177	10	nF	50V
2012	4822 122 33177	10	nF	50V
2013	4822 122 33177	10	nF	50V
2014	5322 122 31863	330	pF	50V
2015	4822 124 23053	1	µF	63V
2016	4822 124 23053	1	µF	63V
2017	4822 124 22826	10	µF	16V
2018	4822 124 22826	10	µF	16V
2019	4822 122 33177	10	nF	50V
2020	4822 126 10002	100	nF	25V
2021	4822 124 22826	10	µF	16V
2022	4822 122 33177	10	nF	50V
2023	4822 126 13123	68	pF	63V
2024	5322 122 32659	33	pF	50V
2025	5322 122 32452	47	pF	63V
2026	4822 126 13222	390	pF	63V
2027	4822 124 23179	10	µF	16V
2028	4822 124 22826	10	µF	16V
2029	4822 126 13475	200	pF	
2031	5322 122 32448	10	pF	50V
2032	5322 122 32452	47	pF	63V
2033	4822 124 23027	47	µF	6.3V
2034	4822 124 81074	220	µF	6,3V
2035	5322 122 32661	56	pF	50V
2036	5322 122 32659	33	pF	50V
2037	5322 122 34123	1	nF	50V
2038	4822 126 10002	100	nF	25V
2039	4822 122 33514	68	pF	50V
2040	4822 122 33514	68	pF	50V
2041	5322 122 31946	27	pF	63V
2042	5322 122 32452	47	pF	63V
2043	4822 122 33177	10	nF	50V
2044	4822 122 33514	68	pF	50V
2045	4822 126 10326	180	pF	63V
2046	4822 122 33575	220	pF	50V
2047	4822 126 13689	18	pF	63V
2048	4822 122 33514	68	pF	50V
2049	5322 122 32658	22	pF	50V
2050	4822 126 10002	100	nF	25V
2051	5322 122 32531	100	pF	50V
2052	5322 122 33861	120	pF	50V
2053	5322 122 32659	33	pF	50V
2054	5322 122 31946	27	pF	63V
2055	4822 122 33575	220	pF	63V
2055	5322 116 80853	560	pF	
2056	4822 126 13061	220	nF	25V
2057	4822 122 33177	10	nF	50V
2058	4822 126 13521	180	pF	63V
2060	4822 122 33177	10	nF	50V
2065	4822 124 23027	47	µF	6.3V
2066	4822 122 33177	10	nF	50V
2067	5322 122 34123	1	nF	50V
2068	4822 126 10002	100	nF	25V
2069	4822 122 33177	10	nF	50V
2077	4822 122 33177	10	nF	50V
2079	5322 121 42661	330	nF	63V
2081	5322 122 32452	47	pF	63V
2083	5322 122 32448	10	pF	50V
2084	4822 126 10002	100	nF	25V
2085	4822 124 22826	10	µF	16V
2086	4822 124 80729	22	µF	16V
2087	4822 122 33177	10	nF	50V
2094	5322 122 32452	47	pF	63V
2100	4822 122 33177	10	nF	50V
2101	5322 122 32531	100	pF	50V
2102	5322 122 32658	22	pF	50V
2103	5322 122 34123	1	nF	50V
2104	4822 122 33177	10	nF	50V
2105	4822 122 33177	10	nF	50V
2106	4822 122 33177	10	nF	50V
2107	4822 122 33177	10	nF	50V
2108	5322 122 33538	150	pF	63V
2109	5322 122 32481	15	pF	50V
2110	4822 126 10002	100	nF	25V
2111	4822 122 33514	68	pF	50V
2112	4822 122 33177	10	nF	50V
2113	4822 126 10002	100	nF	25V
2114	5322 122 32654	22	nF	63V
2115	4822 122 33575	220	pF	50V
2116	4822 122 33177	10	nF	50V
2117	5322 122 34123	1	nF	50V
2118	5322 122 32659	33	pF	50V
2119	5322 122 32531	100	pF	50V
2121	5322 122 34123	1	nF	50V
2122	4822 122 33177	10	nF	50V
2123	4822 126 10002	100	nF	25V
2124	4822 126 10002	100	nF	25V
2125	5322 122 32448	10	pF	50V
2126	5322 122 32658	22	pF	50V
2127	4822 126 10326	180	pF	63V
2128	4822 122 32139	12	pF	63V
2129	4822 122 33515	82	pF	63V
2130	4822 122 33575	220	pF	50V
2132	5322 122 32269	6,8	pF	50V
2133	5322 122 32452	47	pF	63V
2134	4822 122 33575	220	pF	50V
2135	4822 122 33514	68	pF	50V
2150	4822 122 33177	10	nF	50V
2151	5322 122 32654	22	nF	63V

⚠ ... Safety component, use only this type

2152	4822 126 13061	220	nF	25V
2153	4822 122 33177	10	nF	50V
2154	4822 122 33177	10	nF	50V
2156	4822 122 33177	10	nF	50V
2158	4822 122 33177	10	nF	50V
2159	4822 122 33177	10	nF	50V
2161	5322 122 32531	100	pF	50V
2162	4822 122 33177	10	nF	50V
2163	4822 122 33177	10	nF	50V
2164	4822 124 40433	47	µF	25V
2165	5322 122 32531	100	pF	50V
2166	4822 124 40433	47	µF	25V
2168	4822 126 10002	100	nF	25V
2169	4822 122 33177	10	nF	50V
2170	4822 122 33177	10	nF	50V
2171	4822 122 33177	10	nF	50V
2172	4822 122 33177	10	nF	50V
2173	5322 122 32658	22	pF	50V
2174	4822 122 33177	10	nF	50V
2300	4822 124 80407	1	µF	50V
2301	4822 124 80407	1	µF	50V
2302	4822 124 80407	1	µF	50V
2306	5322 122 32531	100	pF	50V
2307	5322 122 32654	22	nF	63V
2308	5322 122 32531	100	pF	50V
2310	4822 126 10002	100	nF	25V
2311	4822 122 33177	10	nF	50V
2313	4822 122 33575	220	pF	50V
2314	4822 126 10002	100	nF	25V
2315	4822 122 33177	10	nF	50V
2316	4822 122 33797	47	nF	50V
2317	5322 122 32654	22	nF	63V
2318	4822 124 80227	2,2	µF	35V
2319	5322 122 32654	22	nF	63V
2400	4822 126 10002	100	nF	25V
2401	4822 124 80729	22	µF	16V
2402	4822 126 10002	100	nF	25V
2403	5322 122 32658	22	pF	50V
2404	5322 122 32658	22	pF	50V
2405	4822 122 33175	2,2	nF	50V
2408	4822 126 10002	100	nF	25V
2416	4822 126 10002	100	nF	25V
2417	4822 124 23178	47	µF	16V
2440	4822 124 81188	100	µF	50V
2441	4822 126 10002	100	nF	25V
2442	4822 122 33177	10	nF	50V
2455	5322 126 10223	4,7	nF	63V
2459	4822 124 80144	220	µF	25V
2461	5322 126 10223	4,7	nF	63V
2462	4822 124 11537	47	µF	25V
2463	4822 124 80231	47	µF	16V
2464	5322 126 10223	4,7	nF	63V
2465	5322 122 34123	1	nF	50V
2466	4822 124 80231	47	µF	16V
2467	4822 122 33342	33	nF	63V
2468	4822 126 10002	100	nF	25V
2470	4822 122 33177	10	nF	50V
2471	4822 122 33177	10	nF	10NF/50V
2512	4822 124 80231	47	µF	16V
2513	4822 126 10002	100	nF	25V
2514	4822 126 10002	100	nF	25V
2515	4822 126 10002	100	nF	25V
2516	4822 126 10002	100	nF	25V
2517	4822 126 10002	100	nF	25V
2518	4822 126 10002	100	nF	25V
2519	4822 126 10002	100	nF	25V
2540	4822 126 10002	100	nF	25V
2541	4822 122 33175	2,2	nF	50V
2542	4822 122 33342	33	nF	25V
2542	4822 126 10002	100	nF	
2543	4822 126 10002	100	nF	25V
2545	4822 126 10002	100	nF	25V
2570	5322 122 32268	470	pF	50V
2571	5322 122 32268	470	pF	50V
2572	5322 122 32268	470	pF	50V
2575	5322 122 32268	470	pF	50V
2590	4822 122 33177	10	nF	50V
2591	4822 124 80879	100	µF	16V
2592	4822 126 10002	100	nF	25V
2617	4822 124 80231	47	µF	16V
2618	5322 122 31863	330	pF	50V
2619	4822 124 80231	47	µF	16V
2620	4822 121 51655	47	nF	50V
2621	5322 122 34123	1	nF	50V
2622	4822 121 43873	27	nF	50V
2700	4822 126 10002	100	nF	25V
2701	4822 126 10002	100	nF	25V
2702	4822 126 10002	100	nF	25V
2703	4822 124 22826	10	µF	16V
2704	4822 124 80231	47	µF	16V
2705	4822 126 10002	100	nF	25V
2706	4822 122 33575	220	pF	50V
2706	5322 122 34123	1	nF	50V
2707	5322 122 33861	120	pF	50V
2708	4822 124 80729	22	µF	16V
2709	4822 126 10002	100	nF	25V
2710	4822 126 13061	220	nF	25V
2722	5322 122 34123	1	nF	50V
2727	4822 124 80729	22	µF	16V
2728	4822 124 80729	22	µF	16V
2730	5322 122 32452	47	pF	63V
2731	5322 122 32452	47	pF	63V
2732	5322 122 32452	47	pF	63V
2735	4822 122 33177	10	nF	50V
2740	4822 124 41576	2,2	µF	50V
2741	4822 126 10002	100	nF	25V
2742	4822 124 80729	22	µF	16V
2743	4822 126 10002	100	nF	25V
2744	4822 124 80227	2,2	µF	35V
2745	4822 122 33575	220	pF	50V
2746	4822 126 10002	100	nF	50V
2747	4822 126 10002	100	nF	25V
2748	4822 126 12945	8,2	pF	
2749	4822 126 13061	220	nF	25V
2750	4822 124 41576	2,2	µF	50V
2800	5322 122 32481	15	pF	63V
2802	4822 126 10002	100	nF	25V
2803	4822 126 10002	100	nF	25V
2804	4822 124 23053	1	µF	63V
2810	5322 122 33861	120	pF	50V
2811	4822 126 10002	100	nF	25V
2830	5322 122 32661	56	pF	50V
2831	4822 122 33177	10	nF	50V
2832	4822 126 10002	100	nF	25V
2850	4822 124 22826	10	µF	16V
2851	4822 124 22826	10	µF	16V
2852	5322 126 10223	4,7	nF	63V
2853	5322 116 80853	560	pF	63V
2854	5322 126 10223	4,7	nF	63V
2855	5322 116 80853	560	pF	63V
2858	4822 124 22826	10	µF	16V
2860	4822 126 10002	100	nF	25V
2890	4822 126 13061	220	nF	25V

RESISTORS

3000	4822 051 10102	1	k	0,25W
3001	4822 051 20822	8,2	k	0,1W
3002	4822 051 20182	1,8	k	0,1W
3003	4822 051 20223	22	k	0,1W
3004	4822 051 20183	18	k	0,1W
3006	4822 051 20223	22	k	0,1W
3007	4822 051 10102	1	k	0,25W
3008	4822 051 20272	2,7	k	0,1W
3009	4822 051 20473	47	k	0,1W
3010	4822 051 20473	47	k	0,1W
3011	4822 051 20104	100	k	0,1W
3012	4822 051 20221	220	R	0,1W
3013	4822 117 11139	1,5	k	0,1W
3014	4822 051 20272	2,7	k	0,1W
3015	4822 051 20561	560	R	0,1W
3016	4822 051 20472	4,7	k	0,1W
3017	4822 117 10833	10	k	0,1W
3018	4822 117 11449	2,2	k	0,1W
3020	4822 116 83903	4,7	k	0,1W
3021	4822 117 11721	1,3	k	0,1W
3022	4822 051 10102	1	k	0,25W
3023	4822 117 11449	2,2	k	0,1W
3024	4822 117 11449	2,2	k	0,1W

⚠ ... Safety component, use only this type

3025	4822 051 20122	1,2	k	0,1W
3026	4822 051 20331	330	R	0,1W
3027	4822 051 20681	680	R	0,1W
3028	4822 051 20271	270	R	0,1W
3029	4822 051 10102	1	k	0,25W
3030	4822 051 20471	470	R	0,1W
3031	4822 051 20561	560	R	0,1W
3034	4822 051 20471	470	R	0,1W
3035	4822 051 20392	3,9	k	0,1W
3036	4822 051 20122	1,2	k	0,1W
3037	4822 051 20392	3,9	k	0,1W
3039	4822 051 20272	2,7	k	0,1W
3040	4822 051 10102	1	k	0,25W
3041	4822 051 20471	470	R	0,1W
3042	4822 100 12157	10	k	
3043	4822 051 20822	8,2	k	0,1W
3044	4822 117 11139	1,5	k	0,1W
3045	4822 051 10102	1	k	0,25W
3046	4822 051 20472	4,7	k	0,1W
3047	4822 051 20471	470	R	0,1W
3048	4822 051 20681	680	R	0,1W
3049	4822 051 10102	1	k	0,25W
3050	4822 051 10102	1	k	0,25W
3051	4822 051 20561	560	R	0,1W
3052	4822 051 20391	390	R	0,1W
3056	4822 116 52234	100	k	0,5W
3057	4822 100 12157	10	k	
3068	4822 117 11139	1,5	k	0,1W
3073	4822 051 20183	18	k	0,1W
3074	4822 051 20183	18	k	0,1W
3075	4822 051 20473	47	k	0,1W
3076	4822 051 20223	22	k	0,1W
3079	4822 051 20333	33	k	0,1W
3080	4822 117 10833	10	k	0,1W
3081	4822 051 20223	22	k	0,1W
3085	4822 051 20471	470	R	0,1W
3100	4822 051 20331	330	R	0,1W
3101	4822 051 20332	3,3	k	0,1W
3102	4822 051 20821	820	R	0,1W
3103	4822 051 20681	680	R	0,1W
3104	4822 051 10102	1	k	0,25W
3105	4822 051 20391	390	R	0,1W
3106	4822 051 20561	560	R	0,1W
3107	4822 051 10102	1	k	0,25W
3108	4822 051 20473	47	k	0,1W
3109	4822 051 20473	47	k	0,1W
3110	4822 051 20122	1,2	k	0,1W
3111	4822 117 11449	2,2	k	0,1W
3112	4822 051 10102	1	k	0,25W
3113	4822 051 20561	560	R	0,1W
3114	4822 117 10833	10	k	0,1W
3115	4822 051 20183	18	k	0,1W
3116	4822 051 10102	1	k	0,25W
3118	4822 051 20472	4,7	k	0,1W
3119	4822 051 20333	33	k	0,1W
3121	4822 051 20182	1,8	k	0,1W
3122	4822 051 10102	1	k	0,25W
3123	4822 117 10833	10	k	0,1W
3124	4822 117 11139	1,5	k	0,1W
3125	4822 117 11449	2,2	k	0,1W
3126	4822 051 10102	1	k	0,25W
3127	4822 117 11449	2,2	k	0,1W
3128	4822 117 11449	2,2	k	0,1W
3129	4822 051 10102	1	k	0,25W
3150	4822 051 20331	330	R	0,1W
3151	4822 051 20472	4,7	k	0,1W
3152	4822 116 52234	100	k	0,5W
3157	4822 051 20008	0	R	0,1W
3158	4822 051 20393	39	k	0,1W
3159	4822 117 11449	2,2	k	0,1W
3160	4822 051 20331	330	R	0,1W
3161	4822 051 20273	27	k	0,1W
3162	4822 117 10833	10	k	0,1W
3163	4822 051 20224	220	k	0,1W
3167	4822 051 10102	1	k	0,25W
3168	4822 051 20472	4,7	k	0,1W
3169	4822 051 20472	4,7	k	0,1W
3170	4822 051 20101	100	R	0,1W
3171	4822 051 20561	560	R	0,1W
3172	4822 051 20568	5,6	R	0,1W
3173	4822 051 20331	330	R	0,1W
3300	4822 051 20101	100	R	0,1W
3301	4822 051 20101	100	R	0,1W
3302	4822 051 20101	100	R	0,1W
3303	4822 051 20471	470	R	0,1W
3304	4822 050 11002	1	k	0,4W
3305	4822 051 20472	4,7	k	0,1W
3310	4822 051 20472	4,7	k	0,1W
3311	4822 116 52283	4,7	k	0,5W
3312	4822 116 52249	1,8	k	0,5W
3313	4822 116 52284	47	k	0,5W
3315	4822 051 20008	0	R	0,1W
3316	4822 116 52283	4,7	k	0,5W
3321	4822 051 20221	220	R	0,1W
3322	4822 051 20221	220	R	0,1W
3323	4822 051 20221	220	R	0,1W
3351	4822 051 20332	3,3	k	0,1W
3355	4822 051 20008	0	R	0,1W
3370	4822 051 20472	4,7	k	0,1W
3371	4822 051 20472	4,7	k	0,1W
3372	4822 051 20472	4,7	k	0,1W
3374	4822 051 20472	4,7	k	0,1W
3375	4822 051 20472	4,7	k	0,1W
3383	4822 117 11449	2,2	k	0,1W
3384	4822 116 52303	8,2	k	0,5W
3388	4822 051 20008	0	R	0,1W
3400	4822 116 83864	10	k	0,5W
3401	4822 117 10833	10	k	0,1W
3402	4822 050 11002	1	k	0,4W
3403	4822 117 10833	10	k	0,1W
3404	4822 117 10833	10	k	0,1W
3405	4822 117 10833	10	k	0,1W
3406	4822 117 10833	10	k	0,1W
3407	4822 051 20472	4,7	k	0,1W
3408	4822 051 20104	100	k	0,1W
3409	4822 117 10833	10	k	0,1W
3410	4822 051 10102	1	k	0,1W
3411	4822 116 52284	47	k	0,5W
3412	4822 116 52283	4,7	k	0,5W
3413	4822 051 20472	4,7	k	0,1W
3415	4822 116 52283	4,7	k	0,5W
3416	4822 116 83864	10	k	0,5W
3417	4822 117 11383	12	k	0,1W
3418	4822 116 83864	10	k	0,5W
3419	4822 117 10833	10	k	0,1W
3420	4822 117 10833	10	k	0,1W
3422	4822 051 10102	1	k	0,25W
3424	4822 116 52256	2,2	k	0,5W
3426	4822 116 83864	10	k	0,5W
3427	4822 050 11002	1	k	0,4W
3429	4822 050 11002	1	k	0,4W
3430	4822 116 52249	1,8	k	0,5W
3431	4822 116 52276	3,9	k	0,5W
3432	4822 116 52263	2,7	k	0,5W
3433	4822 116 52283	4,7	k	0,5W
3434	4822 116 83961	6,8	k	
3435	4822 117 10833	10	k	0,1W
3436	4822 116 52271	33	k	0,5W
3437	4822 051 20472	4,7	k	0,1W
3438	4822 051 20472	4,7	k	0,1W
3439	4822 051 10102	1	k	0,25W
3440⚠	4822 052 10228	2,2	R	0,33W
3441	4822 051 20158	1,5	R	0,1W
3442	4822 117 11149	82	k	0,1W
3443	4822 051 20223	22	k	0,1W
3444	4822 051 20392	3,9	k	0,1W
3445	4822 116 83864	10	k	0,5W
3446	4822 116 52257	22	k	0,5W
3447	4822 116 52257	22	k	0,5W
3448	4822 116 83864	10	k	0,5W
3449	4822 116 83864	10	k	0,5W
3450	4822 116 52256	2,2	k	0,5W
3451	4822 116 52257	22	k	0,5W
3452	4822 051 20821	820	R	0,1W
3454	4822 051 20682	6,8	k	0,1W
3455	4822 117 10833	10	k	0,1W
3456	4822 117 10833	10	k	0,1W
3457	4822 051 20472	4,7	k	0,1W
3458	4822 117 10833	10	k	0,1W
3459	4822 116 83872	220	R	0,5W
3460	4822 051 20473	47	k	0,1W

⚠ ... Safety component, use only this type

MOBO PAL - BG - I - SECAM

3462	4822 051 20563	56	k	0,1W	
3464	4822 117 11449	2,2	k	0,1W	
3465	4822 050 21809	18	R	0,6W	
3466	4822 116 52217	270	R	0,5W	
3467	4822 116 83872	220	R	0,5W	
3468	4822 116 83872	220	R	0,5W	
3469	4822 116 83872	220	R	0,5W	
3470	4822 116 52264	27	k	0,5W	
3471	4822 116 52222	390	R	0,5W	
3472	4822 116 52264	27	k	0,5W	
3473	4822 116 52222	390	R	0,5W	
3474	4822 117 10833	10	k	0,1W	
3475	4822 116 52289	5,6	k	0,5W	
3476	4822 116 52222	390	R	0,5W	
3477	4822 116 52283	4,7	k	0,5W	
3478	4822 116 52284	47	k	0,5W	
3479	4822 116 52283	4,7	k	0,5W	
3480	4822 051 20104	100	k	0,1W	
3481	4822 117 11449	2,2	k	0,1W	
3482	4822 051 20223	22	k	0,1W	
3483	4822 117 10833	10	k	0,1W	
3484	4822 117 10833	10	k	0,1W	
3485	4822 051 20224	220	k	0,1W	
3486	4822 051 20101	100	R	0,1W	
3487	4822 051 10102	1	k	0,25W	
3488	4822 051 20471	470	R	0,1W	
3489	4822 051 20472	4,7	k	0,1W	
3490	4822 051 20221	220	R	0,1W	
3491	4822 051 20473	47	k	0,1W	
3492	4822 051 20104	100	k	0,1W	
3493	4822 051 20225	2,2	M	0,1W	
3494	4822 051 20104	100, 1		k	
3495	4822 051 20104	100	k	0,1W	
3496	4822 051 20472	4,7	k	0,1W	
3497	4822 051 20472	4,7	k	0,1W	
3498	4822 051 20472	4,7	k	0,1W	
3499	4822 116 52283	4,7	k	0,5W	
3500	4822 051 10102	1	k	0,1W	
3501	4822 051 10102	1	k	0,1W	
3502	4822 051 10102	1	k	0,1W	
3505	4822 051 20104	100	k	0,1W	
3513	4822 051 20472	4,7	k	0,1W	
3515	4822 051 20759	75	R	0,1W	
3516	4822 051 20759	75	R	0,1W	
3517	4822 116 52175	100	R	0,5W	
3518	4822 116 52175	100	R	0,5W	
3540	4822 051 20101	100	R	0,1W	
3541	4822 051 20101	100	R	0,1W	
3542	4822 051 20682	6,8	k	0,1W	
3543	4822 051 20105	1	M	0,1W	
3544	4822 051 20105	1	M	0,1W	
3545	4822 051 20474	470	k	0,1W	
3545	4822 051 20105	1	M		
3546	4822 051 20332	3,3	k	0,1W	
3547	4822 051 20332	3,3	k	0,1W	
3548	4822 051 20562	5,6	k	0,1W	
3549	4822 051 20101	100	R	0,1W	
3550	4822 051 20104	100	k	0,1W	
3551	4822 051 20105	1	M		
3552	4822 051 20008	0	R	0,1W	
3553	4822 051 20008	0	R	0,1W	
3570	4822 051 20759	75	R	0,1W	
3572	4822 051 20224	220	k	0,1W	
3573	4822 051 20473	47	k	0,1W	
3580	4822 051 20224	220	k	0,1W	
3590	4822 116 52244	15	k	0,5W	
3591	4822 116 83864	10	k	0,5W	
3600	4822 051 20479	47	R	0,1W	
3618	4822 100 12159	100	k		
3619	4822 051 20158	1,5	R	0,1W	
3620	4822 051 20473	47	k	0,1W	
3621	4822 051 20104	100	k	0,1W	
3623	4822 117 10833	10	k	0,1W	
3624	4822 051 20332	3,3	k	0,1W	
3625	4822 051 20339	33	R	0,1W	
3626	4822 051 20104	100	k	0,1W	
3638	4822 051 20109	10	R	0,1W	
3701	4822 051 10102	1	k	0,25W	
3702	4822 051 20101	100	R	0,1W	
3703	4822 051 20101	100	R	0,1W	
3704	4822 051 20681	680	R	0,1W	
3705	4822 051 20223	22	k	0,1W	
3706	4822 051 20681	680	R	0,1W	
3709	4822 051 20101	100	R	0,1W	for SECAM
3709	4822 051 20008	0	R	0,1W	
3725	4822 051 20822	8,2	k	0,1W	
3726	4822 051 20273	27	k	0,1W	
3730	4822 116 52251	18	k	0,5W	
3731	4822 051 20183	18	k	0,1W	
3732	4822 051 20391	390	R	0,1W	
3735	4822 051 20391	390	R	0,1W	
3736	4822 051 20562	5,6	k	0,1W	
3742	4822 100 12158	22	k		
3743	4822 100 12156	4,7	k		
3744	4822 051 20154	150	k	0,1W	
3747	4822 051 20391	390	R	0,1W	for SECAM
3747	4822 051 20271	270	R	0,1W	
3747	4822 051 20331	330	R	0,1W	for D/K
3748	4822 100 12158	22	k		
3749	4822 051 20681	680	R	0,1W	
3750	4822 051 20331	330	R	0,1W	
3753	4822 051 20271	270	R	0,1W	
3754	4822 117 11449	2,2	k	0,1W	
3760	4822 051 20681	680	R	0,1W	for PAL I
3760	4822 051 10102	1	k	0,1W	
3761	4822 051 10102	1	k	0,25W	
3762	4822 051 10102	1	k	0,25W	
3764	4822 051 10102	1	k	0,25W	
3766	4822 051 20473	47	k	0,1W	
3767	4822 051 20472	4,7	k	0,1W	
3768	4822 051 20104	100	k	0,1W	
3769	4822 051 20472	4,7	k	0,1W	
3770	4822 051 20104	100	k	0,1W	
3771	4822 051 20472	4,7	k	0,1W	
3780	4822 051 10102	1	k	0,25W	
3781	4822 051 20224	220	k	0,1W	
3782	4822 051 20008	0	R	0,1W	
3804	4822 051 20101	100	R	0,1W	
3805	4822 051 20479	47	R	0,1W	
3806	4822 117 11449	2,2	k	0,1W	
3807	4822 051 20221	220	R	0,1W	
3808	4822 051 20223	22	k	0,1W	
3809	4822 117 10833	10	k	0,1W	
3810	4822 051 20104	100	k	0,1W	
3811	4822 051 10102	1	k	0,25W	
3812	4822 051 20472	4,7	k	0,1W	
3813	4822 051 20472	4,7	k	0,1W	
3830	4822 051 20332	3,3	k	0,1W	
3831	4822 051 20181	180	R	0,1W	
3837	4822 051 10102	1	k	0,25W	
3838	4822 051 20101	100	R	0,1W	
3850	4822 051 20153	15	k	0,1W	
3851	4822 117 10833	10	k	0,1W	
3852	4822 117 10833	10	k	0,1W	
3853	4822 117 10833	10	k	0,1W	
3854	4822 051 20153	15	k	0,1W	
3855	4822 117 10833	10	k	0,1W	
3856	4822 117 11449	2,2	k	0,1W	
3857	4822 051 20472	4,7	k	0,1W	
3858	4822 117 11449	2,2	k	0,1W	
3860	4822 051 20472	4,7	k	0,1W	
3861	4822 051 20223	22	k	0,1W	
3862	4822 051 20153	15	k	0,1W	
3863	4822 051 20104	100	k	0,1W	
3864	4822 051 20472	4,7	k	0,1W	
3865	4822 051 20472	4,7	k	0,1W	
3866	4822 051 20475	4,7	M	0,1W	
3867	4822 051 20475	4,7	M	0,1W	
3870	4822 117 10833	10	k	0,1W	
3871	4822 117 10833	10	k	0,1W	
3872	4822 117 10833	10	k	0,1W	
3873	4822 051 20101	100	R	0,1W	
3890	4822 051 20101	100	R	0,1W	
3891	4822 051 20101	100	R	0,1W	
3892	4822 116 83864	10	k	0,5W	

⚠ .. Safety component, use only this type

MOBO PAL - BG - I - SECAM

JUMPER

4002	4822 051 10008	0R00 5% 0,25W
4003	4822 051 20008	0R00 JUMP. (0805)
4004	4822 051 10008	0R00 5% 0,25W
4005	4822 051 10008	0R00 5% 0,25W
4006	4822 051 20008	0R00 JUMPER (0805)
4007	4822 051 20008	0R00 JUMP. (0805)
4009	4822 051 20008	0R00 JUMP. (0805)
4010	4822 051 20008	0R00 JUMP. (0805)
4012	4822 051 20008	0R00 JUMP. (0805)
4014	4822 051 10008	0R00 5% 0,25W
4015	4822 051 20008	0R00 JUMP. (0805)
4017	4822 051 10008	0R00 5% 0,25W
4026	4822 051 20008	0R00 JUMP. (0805)
4045	4822 051 20008	0R00 JUMP. (0805)
4048	4822 051 20008	0R00 JUMP. (0805)
4051	4822 051 10008	0R00 5% 0,25W
4053	4822 051 10008	0R00 JUMP (1206)
4054	4822 051 20008	0R00 JUMP (0805)
4055	4822 051 20008	0R00 JUMP (0805)
4101	4822 051 20008	0R00 JUMP. (0805)
4102	4822 051 20008	0R00 JUMP. (0805)
4103	4822 051 10008	0R00 5% 0,25W
4104	4822 051 20008	0R00 JUMP. (0805)
4105	4822 051 10008	0R00 5% 0,25W
4106	4822 051 10008	0R00 5% 0,25W
4108	4822 051 20008	0R00 JUMP. (0805)
4109	4822 051 10008	0R00 5% 0,25W
4110	4822 051 20008	0R00 JUMP. (0805)
4112	4822 051 20008	0R00 JUMP. (0805)
4113	4822 051 20008	0R00 JUMP. (0805)
4114	4822 051 20008	0R00 JUMP. (0805)
4403	4822 051 20008	0R00 JUMP. (0805)
4404	4822 051 10008	0R00 5% 0,25W
4406	4822 051 10008	0R00 5% 0,25W
4408	4822 051 10008	0R00 5% 0,25W
4501	4822 051 20008	0R00 JUMP. (0805)
4502	4822 051 10008	0R00 5% 0,25W
4503	4822 051 10008	0R00 5% 0,25W
4504	4822 051 20008	0R00 JUMP. (0805)
4505	4822 051 20008	0R00 JUMP. (0805)
4506	4822 051 20008	0R00 JUMP. (805)
4507	4822 051 20008	0R00 JUMP. (805)
4508	4822 051 10008	0R00 5% 0,25W
4509	4822 051 10008	0R00 5% 0,25W
4512	4822 051 10008	0R00 5% 0,25W
4515	4822 051 20008	0R00 JUMP. (0805)
4516	4822 051 10008	0R00 5% 0,25W
4517	4822 051 10008	0R00 5% 0,25W
4518	4822 051 10008	0R00 5% 0,25W
4519	4822 051 10008	0R00 5% 0,25W
4523	4822 051 10008	0R00 5% 0,25W
4524	4822 051 10008	0R00 5% 0,25W
4530	4822 051 10008	0R00 5% 0,25W
4531	4822 051 10008	0R00 5% 0,25W
4532	4822 051 10008	0R00 5% 0,25W
4538	4822 051 10008	0R00 5% 0,25W
4540	4822 051 20008	0R00 JUMP. (0805)
4542	4822 051 10008	0R00 5% 0,25W
4543	4822 051 10008	0R00 5% 0,25W
4546	4822 051 10008	0R00 5% 0,25W
4601	4822 051 10008	0R00 5% 0,25W
4701	4822 051 20008	0R00 JUMP. (0805)
4702	4822 051 10008	0R00 5% 0,25W
4708	4822 051 20008	0R00 JUMP. (0805)
4709	4822 051 20008	0R00 JUMPER (0805)
4710	4822 051 20008	0R00 JUMPER (0805)
4711	4822 051 20008	0R00 JUMP. (0805)
4712	4822 051 20008	0R00 JUMPER (0805)
4713	4822 051 20008	0R00 JUMP. (0805)
4715	4822 051 20008	0R00 JUMPER (0805)
4716	4822 051 20008	0R00 JUMPER (0805)
4717	4822 051 20008	0R00 JUMPER (0805)
4718	4822 051 20008	0R00 JUMPER (0805)
4719	4822 051 20008	0R00 JUMPER (0805)
4722	4822 051 20008	0R00 JUMPER (0805)
4723	4822 051 20008	0R00 JUMP. (0805)
4724	4822 051 20008	0R00 JUMPER (0805)
4725	4822 051 20008	0R00 JUMP. (0805)
4750	4822 051 20008	0R00 JUMP. (0805)
4751	4822 051 10008	0R00 5% 0,25W
4752	4822 051 10008	0R00 5% 0,25W
4753	4822 051 10008	0R00 5% 0,25W
4754	4822 051 20008	0R00 JUMP. (0805)
4755	4822 051 10008	0R00 JUMP (1206)
4760	4822 051 10008	0R00 5% 0,25W
4761	4822 051 10008	0R00 5% 0,25W
4763	4822 051 10008	0R00 5% 0,25W
4764	4822 051 10008	0R00 5% 0,25W
4765	4822 051 10008	0R00 5% 0,25W
4766	4822 051 10008	0R00 5% 0,25W
4767	4822 051 10008	0R00 5% 0,25W
4772	4822 051 20008	0R00 JUMPER (0805)
4801	4822 051 10008	0R00 5% 0,25W
4804	4822 051 20008	0R00 JUMP. (0805)
4805	4822 051 10008	0R00 5% 0,25W
4806	4822 051 10008	0R00 5% 0,25W
4807	4822 051 20008	0R00 JUMP. (0805)

COILS

5000	4822 157 63717	6,8MUH
5001	4822 157 53066	15UF10%
5002	4822 157 63717	6,8MUH
5003	4822 157 52333	100UH
5004	4822 157 53265	100 µH
5005	4822 157 52842	15 µH
5006	4822 157 10972	15UH 5%
5007	4822 157 53253	27 µH
5008	4822 157 10973	8,2UH 5%
5009	4822 157 53253	27 µH
5010	4822 157 52842	15 µH
5011	4822 157 53265	100 µH
5012	4822 157 70015	
5013	4822 157 52842	15 µH
5014	4822 157 63678	560MUH
5069	4822 157 60147	2,2UH
5081	4822 157 52285	6,8 µH
5100	4822 157 63661	FIL LC VAR 4M286 5VS
5101	4822 157 52842	15 µH
5102	4822 157 63676	56MUH
5103	4822 157 63661	FIL LC VAR 4M286 5VS
5104	4822 157 71456	150UH 5%
5105	4822 157 71456	150UH 5%
5106	4822 157 63675	330MUH
5107	4822 157 53265	100 µH
5108	4822 157 63659	FIL LC VAR 1G072 5V2
5110	4822 157 53251	8,2 µH
5111	4822 157 71287	82UH 5%
5112	4822 157 71287	82UH 5%
5113	4822 157 71456	150UH 5%
5114	4822 157 52842	15 µH
5150	4822 157 10449	47UH 10%
5151	4822 157 10449	47UH 10%
5300⚠	4822 157 53005	
5400	4822 157 52983	22UH 10%
5402	4822 157 52265	100 µH
5403	4822 157 53252	22 µH
5405	4822 157 63343	
5406⚠	4822 157 53005	
5460	4822 157 52333	100UH
5510	4822 157 60123	6,8UH
5602	4822 157 71246	330UH 10%
5603	4822 157 53531	
5702	4822 157 52285	6,8 µH
5703	4822 157 52285	6,8 µH
5704	4822 157 71206	BLM21A10PT
5705	4822 157 52285	6,8 µH
5720	4822 157 62681	
5721	4822 157 70877	77,8MHZ
5725	4822 157 70877	77,8MHZ
5727	4822 157 52285	6,8 µH
5740	4822 157 70037	12MUH
5740	4822 157 52842	15 µH
5750	4822 157 63343	10MH 5%
5800	4822 157 10974	33UH
5801	4822 157 60123	6,8UH
5802	4822 157 70503	4,7MUH
5810	4822 152 20677	10MUH
5830	4822 157 70746	22UH
5831	4822 157 10451	30UH 5%

⚠ ... Safety component, use only this type

MOBO PAL - BG - I - SECAM

DIODES

6000	4822 130 30621	1N4148
6098	4822 130 83934	MBR360
6460	4822 130 10231	V298PB
6570	4822 130 34197	BZX79-B12
6572	4822 130 34197	BZX79-B12
6573	4822 130 31024	BZX79-B18
6574	4822 130 33699	BZX84-C12
6575	4822 130 34197	BZX79-B12
6576	4822 130 34197	BZX79-B12
6577	4822 130 34197	BZX79-B12
6590	4822 130 34278	BZX79-B6V8
6760	4822 130 10414	BA792
6761	4822 130 10414	BA792
6780	4822 130 34197	BZX79-B12
6830	5322 130 34331	BAV70

TRANSISTORS & IC's

7000	4822 130 61495	DTA124EK
7002	4822 130 61495	DTA124EK
7003	4822 130 61495	DTA124EK
7004	4822 130 42513	BC858C
7005	5322 130 41982	BC848B
7006	4822 130 44197	BC558B
7007	5322 130 41982	BC848B
7008	5322 130 41982	BC848B
7009	4822 130 60729	DTC124EK
7010	5322 130 41982	BC848B
7013	5322 130 41982	BC848B
7014	4822 130 42353	BSF19-F2
7015	4822 130 61495	DTA124EK
7016	4822 130 61495	DTA124EK
7018	4822 130 42353	BSF19-F2
7019	5322 130 41982	BC848B
7020	4822 130 42353	BSF19-F2
7021	4822 130 60383	BF824
7035	4822 209 60177	LM339D
7036	4822 130 60729	DTC124EK
7038	4822 130 60729	DTC124EK
7039	4822 130 60729	DTC124EK
7040	4822 130 60729	DTC124EK
7051	4822 209 90538	LA7437A
7060	4822 209 14807	LC89979M
7100	5322 130 41982	BC848B
7101	5322 130 41982	BC848B
7102	4822 209 73852	PMBT2369
7103	5322 130 41982	BC848B
7104	4822 130 60729	DTC124EK
7105	5322 130 41982	BC848B
7106	5322 130 41982	BC848B
7110	4822 209 90189	TDA4722/V2
7150	4822 209 90422	STV5744
7151	4822 209 90421	STV5712
7160	4822 130 42353	BSF19-F2
7161	4822 130 60729	DTC124EK
7162	4822 130 61495	DTA124EK
7300	4822 209 13126	TDA5241
7400	4822 209 14808	TMP91C642AF PTDP2-xU
7401	5322 209 11306	HEF4094BT PHIN
7402	4822 130 61495	DTA124EK
7406	4822 130 61495	DTA124EK
7408	4822 130 60729	DTC124EK
7409	5322 130 41982	BC848B
7411	5322 130 41982	BC848B
7440	4822 209 30146	L2722
7455	4822 130 61495	DTA124EK
7456	5322 130 41982	BC848B
7457	5322 130 41982	BC848B
7458	5322 130 41982	BC848B
7460	4822 209 30836	SAA1310P/N2
7460	4822 209 30836	SAA1310/N2
7461	4822 130 10232	S298P
7462	4822 130 10232	S298P
7463	4822 130 41344	BC337-40
7464	4822 130 10233	TCRT5000L
7465	4822 130 10233	TCRT5000L OPT COUPL
7466	4822 130 10234	TCST1030L
7467	5322 130 41982	BC848B
7468	5322 130 41982	BC848B
7469	5322 130 41982	BC848B
7470	4822 130 10214	STD17N06
7471	4822 130 60729	DTC124EK
7500	5322 130 41982	BC848B
7540	4822 209 12674	SDA5649
7540	4822 209 32728	SDA5642-5
7552	4822 209 90016	STV6400
7604	4822 130 41715	BC328-40
7606	5322 130 41982	BC848B
7609	4822 130 42615	BC817-40
7720	4822 209 90288	TDA9800T/V3
7721	5322 130 41983	BC858B
7722	5322 209 14481	HEF4053BT
7723	4822 209 90452	TDA9814T/V3
7723	4822 209 90431	IC TDA9813T/V3
7724	5322 130 42136	BC848C
7726	4822 130 60729	DTC124EK
7729	5322 130 41982	BC848B
7730	5322 130 41982	BC848B
7780	4822 130 60729	DTC124EK
7781	4822 130 10463	MTD15N06V
7800	4822 209 13119	LC74781
7801	5322 130 41982	BC848B
7802	5322 130 41983	BC858B
7810	5322 130 41982	BC848B
7811	5322 130 41982	BC848B
7821	5322 130 41982	BC848B
7830	5322 130 41983	BC858B
7850	4822 209 80631	LM339N-00
7851	5322 130 41982	BC848B
7852	5322 130 41982	BC848B
7890	4822 209 32283	ST24C08CB1
7890	4822 209 32709	EEPROM 24C04

⚠ ... Safety component, use only this type

PAF

MISCELLANEOUS

1101⚠	4822 071 52501	Fuse 250mA
1700⚠	4822 071 52501	Fuse 250mA
1710	4822 242 10433	CRYSTAL 8,192MHZ
1781	4822 242 82059	CRYSTAL10MHZ

CONNECTORS

1911	4822 265 10478	15p
1912	4822 265 10494	12P
1913	4822 267 10496	6p
1914	4822 267 10497	CINCH SOCKET 2FOLD
1915	4822 267 10375	6P HLEM
1916	4822 267 10498	3p
1954	4822 265 10479	SCART SOCKET
1970	4822 267 10499	10p

CAPACITORS

2100	4822 124 80227	2,2	µF	35V
2101	5322 122 32654	22	nF	63V
2102	5322 122 32654	22	nF	63V
2103	4822 126 13061	220	nF	25V
2104	4822 126 13061	220	nF	25V
2105	4822 126 13061	220	nF	25V
2106	4822 126 13061	220	nF	25V
2107	4822 126 13061	220	nF	25V
2108	4822 126 13061	220	nF	25V
2109	4822 126 13061	220	nF	25V
2110	5322 122 32654	22	nF	63V
2111	5322 122 32654	22	nF	63V
2112	4822 126 13061	220	nF	25V
2113	4822 126 13061	220	nF	25V
2114	5322 126 10223	4,7	nF	63V
2115	5322 126 10223	4,7	nF	63V
2117	4822 122 33177	10	nF	50V
2120	5322 122 32531	100	pF	50V
2121	4822 124 22826	10	µF	16V
2122	4822 124 22826	10	µF	16V
2123	4822 124 80879	100	µF	16V
2124	4822 124 80879	100	µF	16V
2125	4822 124 22826	10	µF	16V
2126	4822 124 22826	10	µF	16V
2127	4822 124 22826	10	µF	16V
2128	4822 124 22826	10	µF	16V
2130	4822 124 22826	10	µF	16V
2131	4822 124 22826	10	µF	16V
2132	4822 124 22826	10	µF	16V
2133	4822 124 22826	10	µF	16V
2134	4822 124 22826	10	µF	16V
2135	4822 124 22826	10	µF	16V
2136	4822 126 10002	100	nF	25V
2137	5322 122 32268	470	pF	50V
2138	5322 122 32268	470	pF	50V
2140	4822 124 11569	4,7	µF	25V
2141	4822 124 11569	4,7	µF	25V
2150	4822 126 13061	220	nF	25V
2151	4822 126 13061	220	nF	25V
2570	5322 122 32268	470	pF	50V
2571	5322 122 32268	470	pF	50V
2580	5322 122 32268	470	pF	50V
2581	5322 122 32268	470	pF	50V
2600	4822 122 33806	820	pF	63V
2602	5322 122 31865	1,5	nF	63V
2605	4822 124 81296	10	µF	16V
2609	4822 124 80231	47	µF	16V
2610	4822 122 33177	10	nF	50V
2611	4822 126 13061	220	nF	25V
2612	4822 122 33342	33	nF	63V
2613	4822 122 33128	15	nF	63V
2614	4822 124 23053	1	µF	63V
2615	4822 124 22826	10	µF	16V
2700	4822 122 33172	390	pF	50V
2701	5322 122 32448	10	pF	50V
2703	4822 126 10002	100	nF	25V
2704	4822 122 33575	220	pF	50V
2705	4822 124 22826	10	µF	16V
2706	4822 124 22826	10	µF	16V
2707	4822 126 13061	220	nF	25V
2708	5322 122 32654	22	nF	63V
2709	5322 122 32531	100	pF	50V
2710	5322 122 32531	100	pF	50V
2711	4822 126 10002	100	nF	25V
2714	4822 124 80231	47	µF	16V
2716	4822 124 80231	47	µF	16V
2718	4822 126 10002	100	nF	25V
2719	4822 122 33175	2,2	nF	50V
2720	4822 122 33175	2,2	nF	50V
2721	4822 126 13061	220	nF	25V
2722	4822 122 33175	2,2	nF	50V
2723	4822 122 33175	2,2	nF	50V
2724	4822 122 33177	10	nF	50V
2725	4822 124 23053	1	µF	63V
2726	4822 122 33797	47	nF	50V
2727	4822 124 80231	47	µF	16V
2728	4822 126 10002	100	nF	25V
2729	4822 124 22826	10	µF	16V
2731	4822 124 22826	10	µF	16V
2732	4822 126 10002	100	nF	25V
2733	4822 124 80231	47	µF	16V
2734	5322 122 32654	22	nF	63V
2752	4822 126 13061	220	nF	25V
2753	4822 126 13061	220	nF	25V
2780	4822 124 22826	10	µF	16V
2781	4822 122 33177	10	nF	50V
2782	4822 126 10002	100	nF	25V
2783	5322 126 10184	680	pF	
2784	4822 124 80231	47	µF	16V
2785	5322 122 32531	100	pF	50V
2786	4822 124 80227	2,2	µF	35V
2787	4822 124 80227	2,2	µF	35V
2788	5322 122 32654	22	nF	63V
2789	4822 122 33177	10	nF	50V
2790	4822 122 33177	10	nF	50V
2791	4822 124 80227	2,2	µF	35V
2792	4822 124 80227	2,2	µF	35V

RESISTORS

3106	4822 051 20822	8,2	k	0,1W
3107	4822 051 20184	180	k	0,1W
3108	4822 051 20183	18	k	0,1W
3109	4822 051 20223	22	k	0,1W
3110	4822 116 83872	220	R	0,5W
3111	4822 116 83872	220	R	0,5W
3112	4822 116 83872	220	R	0,5W
3113	4822 116 83872	220	R	0,5W
3116	4822 051 20335	3,3	M	0,1W
3119	4822 051 20104	100	k	0,1W
3121	4822 116 52175	100	R	0,5W
3122	4822 116 52175	100	R	0,5W
3127	4822 117 10833	10	k	0,1W
3130	4822 051 20104	100	k	0,1W
3131	4822 051 20104	100	k	0,1W
3132	4822 051 20104	100	k	0,1W
3133	4822 051 20104	100	k	0,1W
3134	4822 116 52175	100	R	0,5W
3135	4822 116 52175	100	R	0,5W
3136	4822 116 52175	100	R	0,5W
3137	4822 051 20101	100	R	0,1W
3139	4822 116 52175	100	R	0,5W
3140	4822 051 20104	100	k	0,1W
3142	4822 051 20104	100	k	0,1W
3540	4822 051 20682	6,8	k	0,1W
3550	4822 051 20759	75	R	0,1W
3570	4822 051 20224	220	k	0,1W
3571	4822 051 20224	220	k	0,1W
3581	4822 116 52175	100	R	0,5W
3583	4822 116 52175	100	R	0,5W
3590	4822 116 52303	8,2	k	0,5W
3591	4822 117 11449	2,2	k	0,1W
3601	4822 117 11449	2,2	k	0,1W
3607	4822 051 20335	3,3	M	0,1W
3608	4822 051 20335	3,3	M	0,1W
3615	4822 051 20221	220	R	0,1W
3616	4822 051 20221	220	R	0,1W

⚠ ... Safety component, use only this type

PAF

17	4822 051 20223	22	k	0,1W
650	4822 116 52234	100	k	0,5W
651	4822 051 20104	100	k	0,1W
652	4822 117 11449	2,2	k	0,1W
700	4822 051 10102	1	k	0,25W
701	4822 051 20101	100	R	0,1W
702	4822 051 20223	22	k	0,1W
703	4822 051 20104	100	k	0,1W
704	4822 117 11449	2,2	k	0,1W
705	4822 051 20392	3,9	k	0,1W
706	4822 157 71206	600, 1		R
707	4822 051 20392	3,9	k	0,1W
708	4822 117 11449	2,2	k	0,1W
710	4822 051 20334	330	k	0,1W
711	4822 116 52175	100	R	0,5W
712	4822 116 52175	100	R	0,5W
713	4822 051 20182	1,8	k	0,1W
714	4822 051 20333	33	k	0,1W
715	4822 117 10833	10	k	0,1W
720	4822 117 10833	10	k	0,1W
721	4822 117 10833	10	k	0,1W
722	4822 117 10833	10	k	0,1W
723	4822 117 10833	10	k	0,1W
736	4822 051 20008	0	R	0,1W
736	4822 051 20562	5,6	k	0,1W
780	4822 116 52175	100	R	0,5W
781	4822 116 52175	100	R	0,5W
782	4822 051 20333	33	k	0,1W
784	4822 051 20008	0	R	0,1W
785	4822 051 20008	0	R	0,1W
790	4822 116 52283	4,7	k	0,5W
791	4822 051 20562	5,6	k	0,1W
792	4822 116 52283	4,7	k	0,5W
3793	4822 051 20562	5,6	k	0,1W
3902	4822 051 10008	0	R	0,25W
3904	4822 051 10008	0	R	0,25W
3905	4822 051 10008	0	R	0,25W
3907	4822 051 10008	0	R	0,25W
3908	4822 051 10008	0	R	0,25W
3909	4822 051 10008	0	R	0,25W
3970	4822 051 20008	0	R	0,1W
3971	4822 051 10008	0	R	0,25W

COILS

5100	4822 157 50961	22 µH
5601	4822 157 70038	
5700	4822 157 63717	6,8MUH
5703	4822 157 71206	BLM21A10PT
5704	4822 157 71206	BLM21A10PT
5705	4822 157 71206	BLM21A10PT
5780	4822 157 70038	

DIODES

6530	4822 130 34278	BZX79-B6V8
6540	4822 130 34197	BZX79-B12
6550	4822 130 34197	BZX79-B12
6560	4822 130 34197	BZX79-B12
6561	4822 130 34197	BZX79-B12
6562	4822 130 34197	BZX79-B12
6563	4822 130 34197	BZX79-B12
6570	4822 130 34197	BZX79-B12
6571	4822 130 34197	BZX79-B12
6580	4822 130 34197	BZX79-B12
6581	4822 130 34197	BZX79-B12
6590	4822 130 31024	BZX79-B18
6700	4822 130 10652	BB149

TRANSISTORS & IC's

7100	4822 209 90455	TDA9614H/N1
7540	4822 130 42616	BC818-40
7650	4822 130 60373	BC856B
7651	5322 130 60159	BC846B
7652	5322 130 60159	BC846B
7700	4822 209 14809	SAA7284ZP/M2
7701	5322 209 61487	LM358N
7710	5322 130 41982	BC848B
7780	4822 209 32501	TDA9840/V2

PDCP1, PDCB1, PDCB2, PDCQ1

MISCELLANEOUS

0003	4822 492 71682	CONTACT SPRING (PDCQ)
0005	4822 256 92072	IR-HOLDER
0006	4822 403 53863	DISPLAYHOLDER
0006	4822 256 92311	IR-HOLDER (PDCQ)
1235	4822 276 13732	SWITCH
1236	4822 276 13732	SWITCH
1237	4822 276 13732	SWITCH
1243	4822 276 13732	SWITCH
1251	4822 276 13732	SWITCH
1252	4822 276 13732	SWITCH
1257	4822 276 13732	SWITCH
1258	4822 276 13732	SWITCH
1266	4822 276 13732	SWITCH
1267	4822 276 13732	SWITCH
1272	4822 276 13732	SWITCH
1273	4822 276 13732	SWITCH
1287	4822 276 13732	SWITCH
1288	4822 276 13732	SWITCH
1297	5322 242 73682	CRYSTAL 32,768 KHZ
1298	4822 242 82114	CRYSTAL 8MHZ
1299	4822 276 13732	SWITCH

CONNECTORS

1921	4822 265 20565	20P HOR HLEM
1921	4822 267 10365	20P VERT HLEM
1922	4822 267 10375	6P F 1,25 HLEM

CAPACITORS

2203	5322 122 32481	15	pF	50V
2204	5322 122 32481	15	pF	50V
2210	4822 122 33177	10	nF	50V
2211	4822 124 81045	220	µF	6,3V
2220	4822 124 23178	47	µF	16V
2220	4822 124 80729	22	µF	16V for PDCB2
2230	4822 122 33177	10	nF	50V
2231	4822 126 13061	220	nF	25V
2237	4822 122 33177	10	nF	50V
2239	4822 122 33177	10	nF	50V
2251	4822 126 10002	100	nF	50V
2251	4822 122 31947	100	nF	50V for PDCP1/P2
2252	4822 122 31947	100	nF	63V
2252	4822 126 10002	100	nF	50V for PDCB2
2297	4822 124 11603	47	mF	5,5V

RESISTORS

3228	4822 051 10221	220	R	1/8W
3228	4822 051 20221	220	R	0,1W for PDCB1
3229	4822 117 10833	10	k	0,1W
3233	4822 117 11449	2,2	k	0,1W
3235	4822 117 10833	10	k	0,1W
3235	4822 051 10103	10	k	1/8W for PDCP1
3236	4822 117 10833	10	k	0,1W
3237	4822 051 20223	22	k	0,1W
3237	4822 116 52257	22	k	1/6W for PDCP1
3238	4822 116 52269	3,3	k	0,5W
3239	4822 116 83864	10	k	1/6W for PDCP1
3239	4822 116 52234	100	k	1/6W
3239	4822 051 20104	100	k	0,1W for PDCQ1
3240	4822 051 10103	10	k	1/8W for PDCB1
3240	4822 117 10833	10	k	0,1W
3250	4822 051 20332	3,3	k	0,1W
3250	4822 051 10332	3,3	k	1/8W for PDCP1
3251	4822 051 20101	100	R	0,1W
3251	4822 116 52175	100	R	1/6W for PDCP1
3252	4822 116 52175	100	R	0,5W
3253	4822 116 52182	15	R	0,5W
3900	4822 051 10008	0	R	0,25W
3901	4822 051 10008	0	R	0,25W
3902	4822 051 10008	0	R	0,25W
3903	4822 051 10008	0	R	0,25W
3903	4822 051 20008	0	R	0,1W for PDCQ1
3904	4822 051 10008	0	R	0,25W
3905	4822 051 20008	0	R	0,1W for PDCP1, B1
3905	4822 051 10008	0	R	0,25W
3906	4822 051 10008	0	R	0,25W
3906	4822 051 20008	0	R	0,1W for PDCB2
3907	4822 051 10008	0	R	0,25W
3908	4822 051 20008	0	R	0,1W
3908	4822 051 10008	0	R	0,25W for PDCB2
3909	4822 051 10008	0	R	0,25W
3910	4822 051 10008	0	R	0,25W
3911	4822 051 10008	0	R	0,25W
3912	4822 051 10008	0	R	0,25W
3913	4822 051 10008	0	R	0,25W
3913	4822 051 20008	0	R	0,1W for PDCQ1
3914	4822 051 10008	0	R	0,25W
3915	4822 051 10008	0	R	0,25W
3916	4822 051 10008	0	R	0,25W
3917	4822 051 10008	0	R	0,25W
3918	4822 051 10008	0	R	0,25W
3919	4822 051 10008	0	R	0,25W
3920	4822 051 10008	0	R	0,25W
3921	4822 051 10008	0	R	0,25W
3922	4822 051 10008	0	R	0,25W
3923	4822 051 20008	0	R	0,1W
3923	4822 051 10008	0	R	0,25W for PDCQ1
3924	4822 051 20008	0	R	0,1W
3924	4822 051 10008	0	R	0,25W for PDCQ1
3925	4822 051 10008	0	R	0,25W
3928	4822 051 10008	0	R	0,25W
3929	4822 051 10008	0	R	0,25W
3929	4822 051 20008	0	R	0,1W for PDCQ1
3930	4822 051 10008	0	R	0,25W
3931	4822 051 10008	0	R	0,25W
3932	4822 051 20008	0	R	0,1W
3932	4822 051 10008	0	R	0,25W for PDCQ1
3933	4822 051 20008	0	R	0,1W
3933	4822 051 10008	0	R	0,25W for PDCQ1
3934	4822 051 10008	0	R	0,25W
3935	4822 051 10008	0	R	0,25W
3936	4822 051 10008	0	R	0,25W
3937	4822 051 10008	0	R	0,25W
3938	4822 051 10008	0	R	0,25W
3938	4822 051 20008	0	R	0,1W for PDCQ1
3939	4822 051 20008	0	R	0,1W
3939	4822 051 10008	0	R	0,25W for PDCQ1
3940	4822 051 10008	0	R	0,25W
3941	4822 051 10008	0	R	0,25W
3942	4822 051 10008	0	R	0,25W
3945	4822 051 10008	0	R	0,25W
3948	4822 051 10008	0	R	0,25W
3995	4822 051 20008	0	R	0,1W
3998	4822 051 20008	0	R	0,1W
3998	4822 051 10008	0	R	0,25W for PDCB2
3999	4822 051 10008	0	R	0,25W

COILS

5200	4822 157 52286	22 µH

DIODES

6231	5322 130 41982	BC848B
6250	4822 130 34197	BZX79-B12
6286	4822 130 30621	1N4148
6287	4822 130 30621	1N4148
6290	4822 130 30621	1N4148
6295	5322 130 41982	BC848B
6296	5322 130 41982	BC848B
6299	4822 130 31983	BAT85

TRANSISTORS & IC's

7201	4822 209 14853	TMP87CS71F PDCH2-xU
7201	4822 209 14854	TMP87CS71F PDCH1-xP
7202	4822 130 91485	15-MT-65GK
7203	4822 212 30842	TFMS5360
7231	4822 130 60729	DTC124EK